Subject Index—Volume 28

Abbreviations and symbols used in this index and their meanings follow: BR–Book Reviews, GR–Good Reading, and L–Letter to the Editor
Announcements, News, and Awards
Physics Organizational Activities
TPT Department: Apparatus
TPT Department: AstroNotes
TPT Department: AV Corner
TPT Department: Book Reviews
TPT Department: Deck the Halls
TPT Department: DOING Physics
TPT Department: Editorial
TPT Department: Etcetera
TPT Department: Figuring Physics
TPT Department: Good Reading from Other Journals
TPT Department: How Things Work
TPT Department: In My Opinion
TPT Department: Letters to the Editor
TPT Department: 19th Century Textbook Illustrations
TPT Department: Physics Problems for Physics Teachers
TPT Department: Physics Trick of the Month
TPT Department: Questions Students Ask
TPT Department: SI Notes
TPT Department: String and Sticky Tape
TPT Department: Would You Believe?
Publications of Lectures
Physics Laboratory Manuals; Secondary Schools
Errors in Physics Classroom Materials
Textbooks for Undergraduates
Textbooks for Students in Grades 9–12
Textbooks for Students in Grades K–8
Books of General Interest to Physics Teachers
Surveys and Tutorial Papers; Resource Letters
Course Design and Evaluation
Science in Secondary School
Curricula and Evaluation
Teaching Methods and Strategies
Learning Theory and Science Teaching
Preservice Teacher Training
Inservice Teacher Training
Audio Visual Aids, Films, Electronic Video Devices
Other Instructional Aids; Posters, Cartoons, Art, Etc.
Instructional Computer Use, Classroom
Instructional Computer Use, Laboratory
Computer Software and Software Reviews
Testing Theory and Techniques
Demonstration Experiments and Apparatus
Laboratory Experiments and Apparatus
Laboratory Course Design, Organization, and Evaluation
Buildings and Facilities
General Physics
Biographical, Historical, and Personal Notes
History of Science
Philosophy of Science
Science and Society
Physics of Games and Sports
Careers in Physics and Science
Other Topics of General Interest
Probability Theory, Stochastic Processes, and Statistics
Numerical Approximation and Analysis
Computational Techniques
Other Topics in Mathematical Methods in Physics
Classical Mechanics of Discrete Systems
Special Relativity
Classical Mechanics of Continuous Media
Topics on General Relativity and Gravitation
Measurement and Error Theory
Units
Measurement of Spatial Dimensions
Mass and Density Measurement
Velocity, Acceleration, and Rotation Measurement
Data Handling and Computation
Testing Equipment
Other Topics in Measurement Science, General Laboratory Techniques, and Instrumentation Systems
Transducers
Servo and Control Devices
Vacuum Production and Techniques
Radioactivity and Electromagnetic Transitions
Other Topics in Nuclear Physics
General Topics in Electromagnetic Technology
Electrostatics and Magnetostatics
Currents and Circuits
Steady-State Electromagnetic Fields; Electromagnetic Induction
Other Topics in Electricity and Magnetism
Wave Fronts and Ray Tracing
Edge and Boundary Effects, Refraction
Physiological Optics, Vision
Atmospheric Optics
Optical Sources and Standards
Optical Devices, Techniques, and Applications
Other Topics in Optics
Aeroacoustics, Atmospheric Sound
Music and Musical Instruments
Bioacoustics
Other Topics in Acoustics
Convective and Constrained Heat Transfer
Radiative Heat Transfer
Thermal Properties of Matter
Other Topics in Heat Flow, Thermal and Thermodynamic Processes
Translational Kinematics
Rotational Kinematics
Newton's Laws of Motion
Forces and Torques
Rotational Dynamics
Linear Momentum
Angular Momentum
Momentum Conservation
Mechanical Energy, Work, Power
Energy Conservation
Mass: Gravitational, Inertial, Measurement, Units
Center of Mass and Center of Gravity
Elastic and Inelastic Collisions
Mechanics of Solids and Rheology
Other Topics in Mechanics, Elasticity, and Rheology
Fluid Dynamics: General Theory
Flows in Ducts, Channels, and Conduits
Other Topics in Fluid Dynamics
Kinetic and Transport Theory
Other Topics in the Physics of Fluids
Thermodynamic Properties and Entropy

Subject Index—Volume 28

Abbreviations and symbols used in this index and their meanings follow: BR–Book Reviews, GR–Good Reading, and L–Letter to the Editor
Announcements, News, and Awards
Physics Organizational Activities
TPT Department: Apparatus
TPT Department: AstroNotes
TPT Department: AV Corner
TPT Department: Book Reviews
TPT Department: Deck the Halls
TPT Department: DOING Physics
TPT Department: Editorial
TPT Department: Etcetera
TPT Department: Figuring Physics
TPT Department: Good Reading from Other Journals
TPT Department: How Things Work
TPT Department: In My Opinion
TPT Department: Letters to the Editor
TPT Department: 19th Century Textbook Illustrations
TPT Department: Physics Problems for Physics Teachers
TPT Department: Physics Trick of the Month
TPT Department: Questions Students Ask
TPT Department: SI Notes
TPT Department: String and Sticky Tape
TPT Department: Would You Believe?
Publications of Lectures
Physics Laboratory Manuals; Secondary Schools
Errors in Physics Classroom Materials
Textbooks for Undergraduates
Textbooks for Students in Grades 9–12
Textbooks for Students in Grades K–8
Books of General Interest to Physics Teachers
Surveys and Tutorial Papers; Resource Letters
Course Design and Evaluation
Science in Secondary School
Curricula and Evaluation
Teaching Methods and Strategies
Learning Theory and Science Teaching
Preservice Teacher Training
Inservice Teacher Training
Audio Visual Aids, Films, Electronic Video Devices
Other Instructional Aids; Posters, Cartoons, Art, Etc.
Instructional Computer Use, Classroom
Instructional Computer Use, Laboratory
Computer Software and Software Reviews
Testing Theory and Techniques
Demonstration Experiments and Apparatus
Laboratory Experiments and Apparatus
Laboratory Course Design, Organization, and Evaluation
Buildings and Facilities
General Physics
Biographical, Historical, and Personal Notes
History of Science
Philosophy of Science
Science and Society
Physics of Games and Sports
Careers in Physics and Science
Other Topics of General Interest
Probability Theory, Stochastic Processes, and Statistics
Numerical Approximation and Analysis
Computational Techniques
Other Topics in Mathematical Methods in Physics
Classical Mechanics of Discrete Systems
Special Relativity
Classical Mechanics of Continuous Media
Topics on General Relativity and Gravitation
Measurement and Error Theory
Units
Measurement of Spatial Dimensions
Mass and Density Measurement
Velocity, Acceleration, and Rotation Measurement
Data Handling and Computation
Testing Equipment
Other Topics in Measurement Science, General Laboratory Techniques, and Instrumentation Systems
Transducers
Servo and Control Devices
Vacuum Production and Techniques
Radioactivity and Electromagnetic Transitions
Other Topics in Nuclear Physics
General Topics in Electromagnetic Technology
Electrostatics and Magnetostatics
Currents and Circuits
Steady-State Electromagnetic Fields; Electromagnetic Induction
Other Topics in Electricity and Magnetism
Wave Fronts and Ray Tracing
Edge and Boundary Effects, Refraction
Physiological Optics, Vision
Atmospheric Optics
Optical Sources and Standards
Optical Devices, Techniques, and Applications
Other Topics in Optics
Aeroacoustics, Atmospheric Sound
Music and Musical Instruments
Bioacoustics
Other Topics in Acoustics
Convective and Constrained Heat Transfer
Radiative Heat Transfer
Thermal Properties of Matter
Other Topics in Heat Flow, Thermal and Thermodynamic Processes
Translational Kinematics
Rotational Kinematics
Newton's Laws of Motion
Forces and Torques
Rotational Dynamics
Linear Momentum
Angular Momentum
Momentum Conservation
Mechanical Energy, Work, Power
Energy Conservation
Mass: Gravitational, Inertial, Measurement, Units
Center of Mass and Center of Gravity
Elastic and Inelastic Collisions
Mechanics of Solids and Rheology
Other Topics in Mechanics, Elasticity, and Rheology
Fluid Dynamics: General Theory
Flows in Ducts, Channels, and Conduits
Other Topics in Fluid Dynamics
Kinetic and Transport Theory
Other Topics in the Physics of Fluids
Thermodynamic Properties and Entropy

Optical Properties and Materials
Magnetic Devices
Other Topics in Electrical and Magnetic Devices
Biophysics, Medical Physics, and Biomedical Engineering
Other Areas of General Interest to Physicists
Fundamental Astronomy
Artificial Earth Satellites
Other Topics in Astronomy and Astrophysics
General Topics on the Solar System
General Topics on Stellar Systems; Galactic and Extragalactic Objects and Systems; the Universe
Errata

Month	*Page Nos.*	*Month*	*Page Nos.*
January	1–64	September	353–432
February	65–128	October	433–512
March	129–192	November	513–576
April	193–256	December	577–640
May	257–352		

ANNOUNCEMENTS, NEWS, AND AWARDS

1990 Distinguished Service Citation: **John L. Hubisz, Jr.**, Robert Resnick; **28**, 139 (1990)

1990 Distinguished Service Citation: **Karen L. Johnston**, Robert Resnick; **28**, 139 (1990)

1990 Distinguished Service Citation: **Philip C. Peters**, Robert Resnick; **28**, 140 (1990)

1990 Distinguished Service Citation: **Roger H. Stuewer**, Robert Resnick; **28**, 140 (1990)

1990 Distinguished Service Citation: **Howard G. Voss**, Robert Resnick; **28**, 141 (1990)

1990 Oersted Medal: **Carl Sagan**, Robert Resnick; **28**, 138 (1990)

1990 Richtmyer Memorial Lecture: **Steven Chu**, Robert Resnick; **28**, 141 (1990)

APPARATUS

Determine the Magnetic Induction of a Coil with a Hall Element, An Zhong; **28**, 123 (1990)

Film-Canister Spectroscope, Edwin Paul Heideman; **28**, 343 (1990)

Harmonic Sliders, Thomas B. Greenslade, Jr.; **28**, 568 (1990)

Heat-Wave Focusing by Concave Reflectors, Richard E. Berg; **28**, 56 (1990)

Measuring Magnetic Force and Magnetic Field of Small Permanent Magnets, J.L. Sandoval, A. Porta, and P. Segarra; **28**, 124 (1990)

Measuring the Heat Produced by a Single Candle, William S. Wagner; **28**, 420 (1990)

On Teaching Why a Rainbow Is Bowshaped, Paul G. Hewitt; **28**, 509 (1990)

Simple Corner Reflectors Improve Data from Sonic Motion Detectors, R.A. Morse; **28**, 423 (1990)

A Simpler Soft-Drink-Can Electroscope, Haym Kruglak; **28**, 620 (1990)

Transverse Wave Machine, Thomas B. Greenslade, Jr.; **28**, 508 (1990)

Using a Standard Force Table to Verify Snell's Law, George Shellenberger; **28**, 422 (1990)

Wave Speed on a String Revisited, Ray Scott Wakeland and Bennet Brabson; **28**, 57 (1990)

Where There's Smoke There's—a Bee Smoker? M. Hobbs and C. Roddy; **28**, 420 (1990)

ASTRONOTES

As Astronomical Illustration of the Zeeman Effect, Anthony J. Weitenbeck; **28**, 511 (1990)

Earth and Moon Motions Around Their Common Center of Mass, Charles A. Eckroth; **28**, 425 (1990)

AV CORNER

Demonstrations Video: Motion, David Koch; **28**, 190 (1990)

Posters in Cartoon Form, Betty P. Preece; **28**, 54 (1990)

Posters: Modern Physics, Stewart E. Brekke; **28**, 349 (1990)

Slides: An Infrared View, William Luzader; **28**, 428 (1990)

Slides: Terrestrial Neighbors, James Watson and Nancy Watson; **28**, 54 (1990)

Thought Questions, Fred Brace; **28**, 349 (1990)

TV Experiment: Center of Mass Motion, Mary Ethel Parrott; **28**, 190 (1990)

TV Experiment: "G", T.P. Zaleskiewicz; **28**, 114 (1990)

TV Experiment: Velocity of Light, T.P. Zaleskiewicz; **28**, 116 (1990)

Video Series: Review of Preview Film, Donald D. Snyder; **28**, 114 (1990)

Visual Relativity, William R. Warren; **28**, 55 (1990)

BOOK REVIEWS

Asteroids: Their Nature and Utilization, C.T. Kowal, Ellis Horwood Ltd., Chichester, England, 1988, dist. by Halsted Press, a division of Wiley, NY, E. Samuel Palmer; **28**, 346 (1990)

Astronomy: The Cosmic Journey, W.K. Hartmann, Wadsworth, Belmont, CA, 1989, Bruce Gregory; **28**, 344 (1990)

The Beauty of Light, B. Bova, Wiley, NY, 1988, Mark Davids; **28**, 187 (1990)

The Big Bang, J. Silk, W.H. Freeman, NY, 1989, J. Russell Harkay; **28**, 187 (1990)

The Discovery of Subatomic Particles, S. Weinberg, W.H. Freeman, NY, 1990, David A. Coker; **28**, 566 (1990)

Electronics for Physics Experiments Using the Apple II Computer, J.W. Snider and J. Priest, Addison-Wesley, Reading, MA, 1989, Phillip J. Rehberger; **28**, 188 (1990)

Energy and Problems of a Technical Society, Revised Ed., J.J. Kraushaar and R.A. Ristinen, Wiley, NY, 1988, John J. Russell; **28**, 188 (1990)

The Facts on File Dictionary of Physics, Revised and Expanded Edition, ed. by J. Daintith, Facts on File Publications, NY, 1988, Eugene Nicolo; **28**, 59 (1990)

A Guide to Introductory Physics Teaching, A.B. Arons, Wiley, NY, 1990, Thomas D. Miner; **28**, 426 (1990)

Horizons, M.A. Seeds, Wadsworth, Belmont, CA, 1989, Darrel Hoff; **28**, 347 (1990)

How to Solve Problems: For Success in Freshman Physics, Engineering, and Beyond, D. Scarl, Dosoris Press, NY, 1989, Wendy T. Padgett; **28**, 346 (1990)

Introductory Mathematics through Science and Applications, J. Berry, A. Norcliffe, and S. Humble, Cambridge Univ. Press, NY, 1989, Peter B. Kahn; **28**, 426 (1990)

Not by Design—The Origin of the Universe, V.J. Stenger, Prometheus Books, 1988, Steve Van Wyk; **28**, 60 (1990)

On the Glassy Sea: An Astronomer's Journey, T. Gehreis, American Institute of Physics, NY, 1988, Thomas D. Miner; **28**, 566 (1990)

Particle Physics in the Cosmos, ed. by R.A. Carrigan, Jr., and W.P. Trower, W.H. Freeman, NY, 1989, James C. Kernohan; **28**, 345 (1990)

Planets Beyond: Discovering the Outer Solar System, M. Littmann, Wiley, NY, 1988, John L. Hubisz; **28**, 249 (1990)

Reading the Mind of God, J. Trefil, Scribner's, NY, 1989, Thomas D. Miner; **28**, 186 (1990)

Rules of Thumb for Physical Scientists, D.J. Fisher, Trans Tech Publications, Brookfield, VT, 1987, H.T. Hudson; **28**, 187 (1990)

The Scientific Companion, C. Emiliani, Wiley, NY, 1988, Thomas D. Miner; **28**, 344 (1990)

Superconductors: Conquering Technology's New Frontier, R. Simon and A. Smith, Plenum Press, NY, 1988, Edward Finkel; **28**, 186 (1990)

Technical Physics, R.E. Bigliani and G. Ferrigno, PWS-Kent Pub. Co., Boston, 1989, Eugene Nicolo; **28**, 345 (1990)

Thematic Origins of Scientific Thought: Kepler to Einstein, Rev. Ed., G. Holton, Harvard Univ. Press, Cambridge, MA, 1988, Guy Faucher; **28**, 345 (1990)

Wondering About Physics, D.I. Dykstra, Jr., and R.G. Fuller, Wiley, NY, 1988, Richard B. Feren; **28**, 59 (1990)

DECK THE HALLS

A Long Precision Air Track, Fritz Schoch and Walter Winiger; **28**, 618 (1990)

1990 Subject Index

EDITORIAL

An Elementary Proposal for Elementary-School Science, Clifford E. Swartz; **28**, 198 (1990)

Has Anything Changed? Judy Franz; **28**, 71 (1990)

How to Win the Science Project Contest, Clifford E. Swartz; **28**, 10 (1990)

Impedance Matching, Clifford E. Swartz; **28**, 136 (1990)

Judgment Day, Clifford E. Swartz; **28**, 262 (1990)

Judicious Hoopla, Clifford E. Swartz; **28**, 360 (1990)

Just-In-Time Education, Clifford E. Swartz; **28**, 438 (1990)

Q and the December Centerfold, Clifford E. Swartz; **28**, centerfold (1990)

We Need Each Other, Clifford E. Swartz; **28**, 520 (1990)

ET CETERA

et cetera, Albert A. Bartlett; **28**, 60 (1990)

et cetera, Albert A. Bartlett; **28**, 178 (1990)

et cetera, Albert A. Bartlett; **28**, 255 (1990)

et cetera, Albert A. Bartlett; **28**, 350 (1990)

et cetera, Albert A. Bartlett; **28**, 429 (1990)

et cetera, Albert A. Bartlett; **28**, 512 (1990)

et cetera, Albert A. Bartlett; **28**, 576 (1990)

et cetera, Albert A. Bartlett; **28**, 585 (1990)

et cetera, Albert A. Bartlett; **28**, 593 (1990)

et cetera, Albert A. Bartlett; **28**, 613 (1990)

et cetera, Albert A. Bartlett; **28**, 620 (1990)

FIGURING PHYSICS

Flexible Plastic Bottle, Paul G. Hewitt; **28**, 352 (1990)

Laser Light, Paul G. Hewitt; **28**, 192 (1990)

Openings between Leaves, Paul G. Hewitt; **28**, 574 (1990)

Small Iron Ball vs Large Plastic Ball, Paul G. Hewitt; **28**, 248 (1990)

Three Colored Lamps, Paul G. Hewitt; **28**, 430 (1990)

Van de Graaff Generator, Paul G. Hewitt; **28**, 113 (1990)

GOOD READING FROM OTHER JOURNALS

Academy Panel Raises Radiation Risk Estimate, E. Marshall, *Science*, Jan. 5, 1990, John L. Roeder; **28**, 572 (1990)

Annals of Radiation: The Hazards of Electromagnetic Fields, P. Brodeur, *The New Yorker*, June 12, 19, and 26, 1989, William D. Foland; **28**, 250 (1990)

Chemistry in the Comics: Part 2. Classic Chemistry, H.A. Carter, *J. Chem. Educ.*, Feb. 1989, Raleigh Ellisen; **28**, 118 (1990)

A Critic At Large: Besso, J. Bernstein, *The New Yorker*, Feb. 27, 1989, Raleigh Ellisen; **28**, 118 (1990)

The Dynamic Aurora, S. Akasofu, *Sci. Am.*, May 1989, Stephen Brusca; **28**, 118 (1990)

Experiments on the Structure of an Individual Elementary Particle, H. Dehmelt, *Science*, Feb. 2, 1990, John L. Roeder; **28**, 573 (1990)

Experiments with High-Energy Neutrino Beams, J. Steinberger, *Science*, Sept. 15, 1989, John L. Roeder; **28**, 250 (1990)

The First High-Energy Neutrino Experiment, M. Schwartz, *Science*, March 17, 1989, John L. Roeder; **28**, 250 (1990)

Getting Them Unstuck: Some Strategies for the Teaching of Reading in Science, J. Walker, *Sch. Sci. & Math.*, Feb. 1989, Robert Hetzel; **28**, 251 (1990)

The Global Impact of the Chernobyl Reactor Accident, L.R. Anspaugh, R.J. Catlin, and M. Goldman, *Science*, Dec. 16, 1988, John L. Roeder; **28**, 119 (1990)

Global Warming (in three parts), A. Fisher, *Pop. Sci.*, Aug. 1989, Sept. 1989, and Oct. 1989, Robert F. Neff; **28**, 506 (1990)

Gravitational Lens Optics, R.D. Blandford, C.S. Kochanek, I. Kovner, and R. Narayan, *Science*, Aug. 25, 1989, John L. Roeder; **28**, 314 (1990)

Laser Cooling Hits New Low, R. Pool, *Science*, June 1, 1990, John L. Roeder; **28**, 573 (1990)

Lise Meitner and the Discovery of Fission, R.L. Sime, *J. Chem. Educ.*, May 1989, Raleigh Ellisen; **28**, 251 (1990)

Mathematical Achievement: Equating the Sexes, R.A. Hensel, *Sch. Sci. & Math.*, Dec. 1989, Robert Hetzel; **28**, 572 (1990)

Musical Events, A. Porter, *The New Yorker*, May 1, 1989, Raleigh Ellisen; **28**, 250 (1990)

Native American School Environments: Focus on Science and Mathematics Education, F. Lawrenz and H. McCreath, *Sch. Sci. & Math.*, Dec. 1988, Robert Hetzel; **28**, 119 (1990)

Natural and Artificially Initiated Lightning, M.A. Uman and E.P. Krider, *Science*, Oct. 27, 1989, John L. Roeder; **28**, 506 (1990)

The New Superconductors: Prospects for Applications, A. Wolsky, R. Giese, and E. Daniels, *Sci. Am.*, Feb. 1989, Stephen Brusca; **28**, 118 (1990)

Observations in Particle Physics from Two Neutrinos to the Standard Model, L.M. Lederman, *Science*, May 12, 1989, John L. Roeder; **28**, 250 (1990)

One Quantum Step, H.C. von Baeyer, *Discover*, June 1990, Robert F. Neff; **28**, 573 (1990)

Paleomagnetism and the Nature of the Geodynamo, R.T. Merrill and P.L. McFadden, *Science*, April 20, 1990, John L. Roeder; **28**, 573 (1990)

A Plumb Line to the Sun, T. Ferris, *Mercury*, May–June 1989, James Stankevitz; **28**, 314 (1990)

Power Play, D. Noland, *Discover*, Dec. 1989, Robert F. Neff; **28**, 506 (1990)

Prediction and Theory Evaluation, S.G. Brush, *Science*, Dec. 1, 1989, John L. Roeder; **28**, 572 (1990)

Quantum Chaos: Enigma Wrapped in a Mystery, R. Pool, *Science*, Feb. 17, 1989, John L. Roeder; **28**, 120 (1990)

The Quantum Wave Function of the Universe, M.M. Waldrop, *Science*, Dec. 2, 1988, John L. Roeder; **28**, 119 (1990)

Rather Than Just Debunking, Encourage People to Think, A. Seckel, *The Skeptical Enquirer*, Spring, 1989, Robert F. Neff; **28**, 118 (1990)

Richard Feynman on Fringe Science, R. Feynman, *The Skeptical Inquirer*, Fall 1989, Robert F. Neff; **28**, 250 (1990)

Sex Differences in Mathematics Achievement: An Emerging Case for Physiological Factors, L. Morrison and E. Rudisill, *Sch. Sci. & Math.*, Nov. 1989; **28**, 506 (1990)

Science in the USSR, Nov.–Dec. 1989; **28**, 506 (1990)

A Small Revolution Gets Under Way, R. Pool, *Science*, Jan. 5, 1990, John L. Roeder; **28**, 573 (1990)

Space Reactors Hinder Gamma Ray Astronomy, M.M. Waldrop, *Science*, Nov. 25, 1988, John L. Roeder; **28**, 119 (1990)

Submarine Power Lines, D. Scott, *Pop. Sci.*, Feb. 1990, Robert F. Neff; **28**, 572 (1990)

Trying Times: Cost of Remodeling SSC Causes Texans to Circle Their Wagons; SSC Design Revisions Call for Thinner Beams and Fatter Magnets; and Hunter Departs DOE after Riling Key Lawmakers and Top Texans, *Phys. Today*, Jan. 1990, Jerry E. Loomer; **28**, 572 (1990)

Vivani's Life of Galileo, M. Segre, *Isis*, June 1989; **28**, 506 (1990)

***Voyager* at Neptune—A Preliminary Report**, W.J. Kaufmann, *Mercury*, Nov.–Dec. 1989, James Stankevitz; **28**, 572 (1990)

HOW THINGS WORK

How Does the Honeybee Sense Polarization? H. Richard Crane; **28**, 504 (1990)

Newton's Yo-Yo, a Square Sprinkler, and a Disposable Battery Tester, H. Richard Crane; **28**, 569 (1990)

Sampling the Weather in the Upper Atmosphere by Balloon, H. Richard Crane; **28**, 182 (1990)

The Stirling Engine—173 Years Old and Running, H. Richard Crane; **28**, 252 (1990)

IN MY OPINION

Mixed CGS and MKS Units in Gas Constant, Govind S. Khandelwal and R. Lee Kernell; **28**, 246 (1990)

A Modest Proposal, John Sherfinski; **28**, 424 (1990)

On the Teaching of Physics, John Hitchcock; **28**, 342 (1990)

LETTERS TO THE EDITOR
90° Erratum; **28**, 261 (1990)
Another View by Iona, Mario Iona; **28**, 444 (1990)
Author's Response, Klaus Weltner; **28**, 518 (1990)
Avoiding the Glare, J. Wallingford; **28**, 362 (1990)
Baierlein's Response to Alonso and Munley, Ralph Baierlein; **28**, 442 (1990)
Better than We Thought, George W. Ficken, Jr.; **28**, 580 (1990)
Binary Aging, Paul E. Wack; **28**, 363 (1990)
Blink-Rate Effect, Carol L. Miles; **28**, 134 (1990)
Caveat *Consumer Reports*, James E. Court; **28**, 135 (1990)
Children Are Not Abstractions, David M. Hammer and Andrea A. DiSessa; **28**, 440 (1990)
The Column Editor Replies, Mario Iona; **28**, 7 (1990)
Comment I by Alonso, Marcelo Alonso; **28**, 441 (1990)
Comment II by Munley, Frank Munley; **28**, 441 (1990)
Dr. Shymansky Answers His Critic, James A. Shymansky; **28**, 6 (1990)
Do Tell—In Writing, Daria Bouadana; **28**, 68 (1990)
Editor's Note; **28**, 6 (1990)
Freezing Points, Michael D. Edmiston; **28**, 260 (1990)
Further Observations of Hugo, Fred T. Pregger; **28**, 363 (1990)
The Grammar of Force, John McClain; **28**, 519 (1990)
Gold Star Bonus, Paul Swartz; **28**, 440 (1990)
The Late Apex Turn, George B. Franklin; **28**, 68 (1990)
Lift and Flow, George D. Freier; **28**, 518 (1990)
Microwave Hot Spots, Barbara S. Andereck; **28**, 580 (1990)
A Mole Is a Mole, Matt Young; **28**, 361 (1990)
More on Matching Impedances, Mark M. Payne; **28**, 362 (1990)
More on the Third Derivative, Paul G. Hewitt; **28**, 199 (1990)
No April Fool, David Kutliroff; **28**, 363 (1990)
Nobel Portraits, Ron Edge; **28**, 134 (1990)
On Matching Impedances, Mitchell Bronk; **28**, 362 (1990)
On the Meaning of Temperature: Editor's Note; **28**, 441 (1990)
Pepys's Account of Levitation, Donald W. Olson and Marilynn S. Olson; **28**, 261 (1990)
Question on the Space Telescope Flaw, Lewis Epstein; **28**, 580 (1990)
Relabel Your Diagram, Bengt Magnusson and Bruce Tiemann; **28**, 199 (1990)
Shooting with a Laser Gun, Mario Iona; **28**, 361 (1990)
Some Nice Distinctions, Gerry McClelland; **28**, 134 (1990)
Speeding Up the Foucault Pendulum, Walter E. Mitchell, Jr.; **28**, 362 (1990)
Stopping the Action, Lawrence C. Davis; **28**, 363 (1990)
Through a Crystal Ball Darkly, John Liston; **28**, 199 (1990)
Unrealistic Example, David R. Hershey; **28**, 260 (1990)
Whither Jack's Beanstalk? Alistair Steyn-Ross; **28**, 134 (1990)
Zero, maybe? Hubert N. Biezeveld; **28**, 134 (1990)
19TH CENTURY TEXTBOOK ILLUSTRATIONS
The Prony Brake, Thomas B. Greenslade, Jr.; **28**, 340 (1990)
PHYSICS LORE
Bohr on Anecdotes, Thomas D. Miner; **28**, 480 (1990)
Joule's Honeymoon, Thomas D. Miner; **28**, 400 (1990)
A Remarkably Energetic Amateur, Thomas D. Miner; **28**, 498 (1990)
Several Physics Lore, Thomas D. Miner; **28**, 338 (1990)
PHYSICS PROBLEMS FOR PHYSICS TEACHERS
Superconductivity, Steve Van Wyk; **28**, 621 (1990)
PHYSICS TRICK OF THE MONTH
The Cartesian Matches, Martin Gardner; **28**, 478 (1990)
The Falling Keys, Martin Gardner; **28**, 390 (1990)
A Square that Ain't There, Martin Gardner; **28**, 562 (1990)
SI NOTES
Business Expects Schools to Teach Metrics, William Hooper; **28**, 120 (1990)
Metrication Is Alive in the United States, William Hooper; **28**, 507 (1990)
STRING AND STICKY TAPE
Battleship in the Bathtub, R.D. Edge; **28**, 510 (1990)
The Funny Physics Funnel, R.D. Edge; **28**, 575 (1990)
The Tumbling Toy, R.D. Edge; **28**, 341 (1990)
The Wobbler, R.D. Edge; **28**, 122 (1990)
WOULD YOU BELIEVE?
Artistic Blunders, Mario Iona; **28**, 116 (1990)
Density, Mario Iona; **28**, 570 (1990)
Misrepresentation or Misconception, Mario Iona; **28**, 184 (1990)
Physics for Technicians—A Systems Approach, Fredrick P. Gram; **28**, 348 (1990)
ERRORS IN PHYSICS CLASSROOM MATERIALS
Artistic Blunders, Mario Iona; **28**, 116 (1990)
The Importance of Scale Drawings, William DeBuvitz; **28**, 604 (1990)
The Meaning of Temperature, Ralph Baierlein; **28**, 94 (1990)
TEXTBOOKS FOR UNDERGRADUATES
Misrepresentation or Misconception, Mario Iona; **28**, 184 (1990)
Mixed CGS and MKS Units in Gas Constant, Govind S. Khandelwal and R. Lee Kernell; **28**, 246 (1990)
Physics for Technicians—A Systems Approach, Fredrick P. Gram; **28**, 348 (1990)
BOOKS OF GENERAL INTEREST TO PHYSICS TEACHERS
A Collection of Simple Physics Demonstrations, Robert Ehrlich; **28**, 492 (1990)
COURSE DESIGN AND EVALUATION
A Graduate Research Model for Talented High-School Students, Glenn Liming; **28**, 412 (1990)
Learning Cycles for a Large-Enrollment Class, Dean Zollman; **28**, 20 (1990)
Physics As an Integrative Theme in Oceanography, Richard L. Myers; **28**, 306 (1990)
SCIENCE IN ELEMENTARY SCHOOL
Density, Mario Iona; **28**, 570 (1990)
Metrication Is Alive in the United States, William Hooper; **28**, 507 (1990)
SCIENCE IN SECONDARY SCHOOL
Another Legend Debunked, Haym Kruglak; **28**, 491 (1990)
Calibration and Efficiency of Microwave Ovens, Ron Fritz; **28**, 564 (1990)
Computer-Generated Interference Patterns, Roger F. Larson; **28**, 336 (1990)
A Launcher for Projectile Motion, Daday van den Berg and Ed van den Berg; **28**, 477 (1990)
Modification of the Classic M & M® Decay Experiment, John S. Garrett; **28**, 611 (1990)
Openings between Leaves, Paul G. Hewitt; **28**, 574 (1990)
Science Education in the Soviet Union, Sergey Chernyshev and Alexander Kusenko; **28**, 270 (1990)
A Superconductivity Workshop, David Austen and Wytze Brouwer; **28**, 232 (1990)
Teaching Geometrical Optics with the "Optic Mirage," Andrzej Sieradzan; **28**, 534 (1990)
Three Colored Lamps, Paul G. Hewitt; **28**, 430 (1990)
TEACHING METHODS AND STRATEGIES
Centripetal Force on a Turntable, John E. Beach; **28**, 106 (1990)
Electric Fields and Football Fields, Mark M. Payne; **28**, 563 (1990)
Forces As Interactions, David P. Maloney; **28**, 386 (1990)
A Graduate Research Model for Talented High-School Students, Glenn Liming; **28**, 412 (1990)
The Hammer Flip, Allan Walstad; **28**, 556 (1990)
How Fast Are We Going? Mark M. Payne; **28**, 102 (1990)
Juggling and the Theorist, Eric Kincanon; **28**, 221 (1990)

Learning Cycles for a Large-Enrollment Class, Dean Zollman; **28,** 20 (1990)
The Mirror Equation, Govind S. Khandelwal and Wynford L. Harries; **28,** 299 (1990)
Mixed CGS and MKS Units in Gas Constant, Govind S. Khandelwal and R. Lee Kernell; **28,** 246 (1990)
On the Teaching of Physics, John Hitchcock; **28,** 342 (1990)
Pedagogical Interlude, Carl H. Hayn; **28,** 166 (1990)
Peer Perspectives I: The Teachers' Story, Mary Ann Shea and John R. Taylor; **28,** 454 (1990)
Peer Perspectives II: The Professor-Student's View, Paul M. Levitt; **28,** 457 (1990)
Physics Haiku, Bill Franklin; **28,** 180, 244, 463 (1990)
The Physics of Dinosaurs, Robert H. Evans; **28,** 364 (1990)
Profound Results from Introductory Physics, Peter Kosso; **28,** 242 (1990)
Raising the *Titanic*, Romona Baker; **28,** 597 (1990)
Retraining Teachers in Physics, John D. McGervey and Dick Heckathorn; **28,** 230 (1990)
Some Moments with the Triple-Beam Balance, Leon Ukens and John Wessner; **28,** 538 (1990)
Teaching Units, Govind S. Khandelwal and W. Maurice Pritchard; **28,** 300 (1990)
Using Contour Maps to Teach Electric Field and Potential, Barbara S. Andereck; **28,** 499 (1990)

LEARNING THEORY AND SCIENCE TEACHING
Concepts in Force and Motion, Nanjundiah Sadanand and Joseph Kess; **28,** 530 (1990)
Forces As Interactions, David P. Maloney; **28,** 386 (1990)
Teaching Superconductivity via Analogy, G.G. Ihas and M.W. Meisel; **28,** 554 (1990)

PRESERVICE TEACHER TRAINING
Learning Cycles for a Large-Enrollment Class, Dean Zollman; **28,** 20 (1990)

INSERVICE TEACHER TRAINING
A Collection of Simple Physics Demonstrations, Robert Ehrlich; **28,** 492 (1990)
Retraining Teachers in Physics, John D. McGervey and Dick Heckathorn; **28,** 230 (1990)
A Superconductivity Workshop, David Austen and Wytze Brouwer; **28,** 232 (1990)

AUDIO AND VISUAL AIDS, FILMS, ELECTRONIC VIDEO DEVICES
An Astronomical Illustration of the Zeeman Effect, Anthony J. Weitenbeck; **28,** 511 (1990)
Demonstrations Video: Motion, David Koch; **28,** 190 (1990)
Earth and Moon Motions Around Their Common Center of Mass, Charles A. Eckroth; **28,** 425 (1990)
The Importance of Scale Drawings, William DeBuvitz; **28,** 604 (1990)
Movie Misconceptions, Marshall Ellenstein; **28,** 246 (1990)
Science Fiction Aids Science Teaching, Leroy W. Dubeck, Matthew H. Bruce, Joseph S. Schmuckler, Suzanne E. Moshier, and Judith E. Boss; **28,** 316 (1990)
Slides: Halley's Comet and Supernova 1987A, John L. Roeder; **28,** 254 (1990)
Slides: An Infrared View, William Luzader; **28,** 428 (1990)
Slides: Terrestrial Neighbors, James Watson and Nancy Watson; **28,** 54 (1990)
Teacup Physics: Centripetal Acceleration, Channon P. Price; **28,** 49 (1990)
Thought Questions, Fred Brace; **28,** 349 (1990)
TV Experiment: Center of Mass Motion, Mary Ethel Parrott; **28,** 190 (1990)
TV Experiment: "G", T.P. Zaleskiewicz; **28,** 114 (1990)
TV Experiment: Velocity of Light, T.P. Zaleskiewicz; **28,** 116 (1990)
TV Experiments—Magnetic Fields, Mary Ethel Parrott; **28,** 254 (1990)
Video Series: Review of Preview Film, Donald D. Snyder; **28,** 114 (1990)
Visual Relativity, William R. Warren; **28,** 55 (1990)

OTHER INSTRUCTIONAL AIDS: POSTERS, CARTOONS, ART, ETC.
Cartoon Physics, Russell Akridge; **28,** 336 (1990)
Computer-Generated Interference Patterns, Roger F. Larson; **28,** 336 (1990)
The Importance of Scale Drawings, William DeBuvitz; **28,** 604 (1990)
A Newton Fest, Ron Revere; **28,** 609 (1990)
Physics Carols, Robert C. Hilborn; **28,** 609 (1990)
Physics Haiku, Bill Franklin; **28,** 180, 244, 463 (1990)
Posters in Cartoon Form, Betty P. Preece; **28,** 54 (1990)
Posters: Modern Physics, Stewart E. Brekke; **28,** 349 (1990)

INSTRUCTIONAL COMPUTER USE: CLASSROOM
Computer-Generated Interference Patterns, Roger F. Larson; **28,** 336 (1990)
Equations of Motion on a Computer Spreadsheet: The Damped Harmonic Oscillator and More, Michael T. Frank and Edward Kluk; **28,** 308 (1990)
Monte Carlo Computer Simulation of a Rainbow, Donald Olson; **28,** 226 (1990)
PC and PVC Acoustics Demonstrations, Stephen Luzader; **28,** 459 (1990)
A Simulation of the Hydrogen Spectrum, Zhao Jiu-ming; **28,** 596 (1990)
Worlds within Worlds: An Introduction to Cellular Automata, Jeremiah P. Reilly and Nicholas B. Tufillaro; **28,** 88 (1990)

INSTRUCTIONAL COMPUTER USE: LABORATORY
An ADC Interface for the Apple II, P. Steven Leiker; **28,** 332 (1990)
Computer Analysis of a Physical Pendulum, Joseph Priest and Larry Potts; **28,** 413 (1990)
Model for an Undergraduate Physics Problem, Joseph Priest and David F. Griffing; **28,** 210 (1990)
Spreadsheets in the Physics Laboratory, Michael E. Krieger and James H. Stith; **28,** 378 (1990)

COMPUTER SOFTWARE AND SOFTWARE REVIEWS
Review of "Essence of Physics," Patrick Tam; **28,** 616 (1990)
A Simulation of the Hydrogen Spectrum, Zhao Jiu-ming; **28,** 596 (1990)

TESTING THEORY AND TECHNIQUES
A "Fun" Semester Final, Joanne Langabee; **28,** 304 (1990)
Model for an Undergraduate Physics Problem, Joseph Priest and David F. Griffing; **28,** 210 (1990)
Photography in the Classroom, Thomas B. Greenslade, Jr.; **28,** 148 (1990)

DEMONSTRATION EXPERIMENTS AND APPARATUS
Battleship in the Bathtub, R.D. Edge; **28,** 510 (1990)
Calibration and Efficiency of Microwave Ovens, Ron Fritz; **28,** 564 (1990)
Centripetal Force on a Turntable, John E. Beach; **28,** 106 (1990)
A Collection of Simple Physics Demonstrations, Robert Ehrlich; **28,** 492 (1990)
Colors on Soap Films—An Interference Phenomenon, Göran Rämme; **28,** 479 (1990)
Coulomb's Law after the Christmas Party, Samaroo Deonarine; **28,** 607 (1990)
Demonstrating the Difference between Velocity and Acceleration, Earl Coombs; **28,** 546 (1990)
An Elasticity Paradox, James E. Kettler; **28,** 416 (1990)
Film-Canister Spectroscope, Edwin Paul Heideman; **28,** 343 (1990)
The Flight of the Boomerang, Michael Hanson; **28,** 142 (1990)
Floating Magnet Demonstration, Masayoshi Wake; **28,** 395 (1990)
Traction Force on Accelerated Rolling Bodies, Richard E. Berg; **28,** 600 (1990)
Haidinger's Brush, Bill Reid; **28,** 598 (1990)
Harmonic Sliders, Thomas B. Greenslade, Jr.; **28,** 568 (1990)
Heat-Wave Focusing by Concave Reflectors, Richard E. Berg; **28,** 56 (1990)

High-Speed Flash Photography with Sound Triggers, Loren M. Winters; **28**, 12 (1990)
Inexpensive Electrostatic Halos, Walter Roy Mellen; **28**, 612 (1990)
A Laser Spirograph for Under $3 (Laser Not Included), Chris Chiaverina; **28**, 606 (1990)
Lightwave Communication Apparatus for the Classroom, John M. Pitre, Paul Sharpe, and Richard Tasgal; **28**, 560 (1990)
Looking for Ghosts to Measure the Speed of Light, David Keeports; **28**, 398 (1990)
Magnetic Field Visualization on the Overhead Projector, Gary P. Johnson; **28**, 244 (1990)
Magnet Symmetry and Newton's Third Law, Robert Chasnov and Louis Overcast; **28**, 112 (1990)
Newton's Yo-Yo, a Square Sprinkler, and a Disposable Battery Tester, H. Richard Crane; **28**, 569 (1990)
The Octopus and the Phasor, L. Ribaud and P.G. Mattocks; **28**, 160 (1990)
On Teaching Why a Rainbow Is Bowshaped, Paul G. Hewitt; **28**, 509 (1990)
On the Difference between Fluids and Dried Beans, Rolf G. Winter; **28**, 104 (1990)
PC and PVC Acoustics Demonstrations, Stephen Luzader; **28**, 459 (1990)
Photography in the Classroom, Thomas B. Greenslade, Jr.; **28**, 148 (1990)
Polarized Light Corridor Demonstrations, G.R. Davies; **28**, 464 (1990)
Retraining Teachers in Physics, John D. McGervey and Dick Heckathorn; **28**, 230 (1990)
Sawblade Optics, Albert J. Read; **28**, 468 (1990)
Self-Inflating Balloons, Dick Walton; **28**, 324 (1990)
A Simple Resonance Demonstration, Gordon C. McIntosh; **28**, 417 (1990)
A Simpler Soft-Drink-Can Electroscope, Haym Kruglak; **28**, 620 (1990)
Shattering Glass with Sound Simplified, Haym Kruglak, Robert Hiltbrand, and Don Kangas; **28**, 418 (1990)
So What Else Can You Do with a Ballistic Pendulum? Robert K.F. Keefer; **28**, 495 (1990)
Standing Waves in a Microwave Oven, Alistair Steyn-Ross and Alister Riddell; **28**, 474 (1990)
The Strobe Cannon, Richard S. Halada; **28**, 488 (1990)
Supernova Core Bounce: A Demonstration, Robert A. Egler; **28**, 558 (1990)
Teacup Physics: Centripetal Acceleration, Channon P. Price; **28**, 49 (1990)
Three Mechanical Demonstrations of Chaos, Robert Ehrlich; **28**, 26 (1990)
Transverse Wave Machine, Thomas B. Greenslade, Jr.; **28**, 508 (1990)
Traveling Wave Pedagogy Using an Oscilloscope, Randall D. Peters; **28**, 337 (1990)
Unexpected Result, David T. Hartney; **28**, 204 (1990)
Van de Graaff Generators: Theory, Maintenance, and Belt Fabrication, Richard E. Berg; **28**, 281 (1990)
Where There's Smoke There's—a Bee Smoker? M. Hobbs and C. Roddy; **28**, 420 (1990)
Which Side of the Grating Has the Grooves? Alfred F. Leung and Simon George; **28**, 98 (1990)
Who Will Win the Race, II? Kevin J. Tillotson; **28**, 537 (1990)
Wine Glasses, Bell Modes, and Lord Rayleigh, Thomas D. Rossing; **28**, 582 (1990)
The Wobbler, Ronald D. Edge; **28**, 122 (1990)

LABORATORY EXPERIMENTS AND APPARATUS

An ADC Interface for the Apple II, P. Steven Leiker; **28**, 332 (1990)
Calibration and Efficiency of Microwave Ovens, Ron Fritz; **28**, 564 (1990)
Collapsing Soda Cans and Efficiency, James McGahan; **28**, 550 (1990)
The Coefficient of Kinetic Friction, Charles J. Reidl, Jr.; **28**, 402 (1990)
Compact Disc Diffraction, Christian Nöldeke; **28**, 484 (1990)
Computer Analysis of a Physical Pendulum, Joseph Priest and Larry Potts; **28**, 413 (1990)
Cryogenic Pyroelectricity: Demonstrating a Newly Discovered Phenomenon in the Classroom, James D. Brownridge, Andrew J. Telesca, Carl R. Stannard, and Thomas P. O'Brien; **28**, 482 (1990)
Determine the Magnetic Induction of a Coil with a Hall Element, An Zhong; **28**, 123 (1990)
An Experiment on Area-to-Volume Ratios, George Barnes; **28**, 403 (1990)
High-Speed Flash Photography with Sound Triggers, Loren M. Winters; **28**, 12 (1990)
Index of Refraction of He and SF_6, Dick Walton; **28**, 323 (1990)
Inexpensive Electrostatic Halos, Walter Roy Mellen; **28**, 612 (1990)
A Launcher for Projectile Motion, Daday van den Berg and Ed van den Berg; **28**, 477 (1990)
Looking for Ghosts to Measure the Speed of Light, David Keeports; **28**, 398 (1990)
Measurements of Sound Velocity by Means of PZT, Judith Bransky; **28**, 125 (1990)
Measuring Magnetic Force and Magnetic Field of Small Permanent Magnets, J.L. Sandoval, A. Porta, and P. Segarra; **28**, 124 (1990)
Modification of the Classic M & M® Decay Experiment, John S. Garrett; **28**, 611 (1990)
The Moment of Inertia of Alex Meyer, Donald Maloney; **28**, 100 (1990)
A Not-So-Obvious Pendulum Experiment, Bruce Denardo and Richard Masada; **28**, 51 (1990)
Potential Energy Analysis of a Bow, Tom Southworth; **28**, 42 (1990)
A Quick Method to Measure the Density of Air, Se-yuen Mak and Zhu E-Qing; **28**, 406 (1990)
Rubber Hysteresis Experiment, Bruce Denardo and Richard Masada; **28**, 489 (1990)
Science Friction Adventure—Part II, Dennis W. Phillips; **28**, 553 (1990)
Self-Inflating Balloons, Dick Walton; **28**, 324 (1990)
Simple Corner Reflectors Improve Data from Sonic Motion Detectors, R.A. Morse; **28**, 423 (1990)
So What Else Can You Do with a Ballistic Pendulum? Robert K.F. Keefer; **28**, 495 (1990)
Sunglasses that Switch On and Off, John Harris and Vittorio Zanetti; **28**, 200 (1990)
Systematic Errors in an Air Track Experiment, Santos A. Ramirez and Joe S. Ham; **28**, 602 (1990)
Using a Standard Force Table to Verify Snell's Law, George Shellenberger; **28**, 422 (1990)
The "VideoStrobe" Water Drop Gravimeter, Karen Brecher and Kenneth Brecher; **28**, 108 (1990)
Wave Speed on a String Revisited, Ray Scott Wakeland and Bennet Brabson; **28**, 57 (1990)

LABORATORY COURSE DESIGN, ORGANIZATION, AND EVALUATION

So What Else Can You Do with a Ballistic Pendulum? Robert K.F. Keefer; **28**, 495 (1990)
A Superconductivity Workshop, David Austen and Wytze Brouwer; **28**, 232 (1990)

PHYSICS GAMES AND CONTESTS

The Cartesian Matches, Martin Gardner; **28**, 478 (1990)
The Falling Keys, Martin Gardner; **28**, 390 (1990)
How to Split Hairs on Fermi Questions, David Chandler; **28**, 170 (1990)
IMAGES: A New Physics Olympics Event, Richard E. Berg; **28**, 400 (1990)
A Newton Fest, Ron Revere; **28**, 609 (1990)
Project Bluebook Revisited, Jeffrey F. Lockwood; **28**, 469 (1990)
A Square that Ain't There, Martin Gardner; **28**, 562 (1990)

GENERAL PHYSICS

Another Legend Debunked, Haym Kruglak; **28**, 491 (1990)
The Cartesian Matches, Martin Gardner; **28**, 478 (1990)

Density, Mario Iona; **28**, 570 (1990)
Illuminating Physics with Light Bulbs, Harvey S. Leff; **28**, 30 (1990)
An Interesting Problem Solved by Vectors, R. Ramirez-Bon; **28**, 594 (1990)
Lapping in Races as a Model for Beats, R.G. Newburgh; **28**, 557 (1990)
On the Difference between Fluids and Dried Beans, Rolf G. Winter; **28**, 104 (1990)
Openings between Leaves, Paul G. Hewitt; **28**, 574 (1990)
Physics and a Skiing Record, Albert A. Bartlett; **28**, 72 (1990)
Physics for Technicians—A Systems Approach, Fredrick P. Gram; **28**, 348 (1990)
Power Transfer in Physical Systems, Jack A. Kaeck; **28**, 214 (1990)
Simple Variable Mass Systems: Newton's Second Law, J. Matolyak and G. Matous; **28**, 328 (1990)
Three Colored Lamps, Paul G. Hewitt; **28**, 430 (1990)
Why Round the Answer? D.L. Mathieson; **28**, 471 (1990)
Wine Glasses, Bell Modes, and Lord Rayleigh, Thomas D. Rossing; **28**, 582 (1990)

BIOGRAPHICAL, HISTORICAL, AND PERSONAL NOTES
Physics Lore, Thomas D. Miner; **28**, 338, 400, 480, 498, 571 (1990)

HISTORY OF SCIENCE
The Prony Brake, Thomas B. Greenslade, Jr.; **28**, 340 (1990)
Women and the Stars, Joseph L. Spradley; **28**, 372 (1990)

SCIENCE AND SOCIETY
Business Expects Schools to Teach Metrics, William Hooper; **28**, 120 (1990)
The Physics of Firefighting, Robert A. Egler; **28**, 599 (1990)
PK Power in the Light of May, Martin Gardner; **28**, 296 (1990)
A World Full of Oil, Albert A. Bartlett; **28**, 540 (1990)

PHYSICS OF GAMES AND SPORTS
Catch the Wave, James Hicks and Chris Chiaverina; **28**, 167 (1990)
The Flight of the Boomerang, Michael Hanson; **28**, 142 (1990)
Physics and a Skiing Record, Albert A. Bartlett; **28**, 72 (1990)
The Tumbling Toy, Ronald D. Edge; **28**, 341 (1990)

OTHER TOPICS OF GENERAL INTEREST
Battleship in the Bathtub, R.D. Edge; **28**, 510 (1990)
Catch the Wave, James Hicks and Chris Chiaverina; **28**, 167 (1990)
Covering the U.S.A.: Exponential Growth of Railroad Tracks, Robert H. Romer; **28**, 46 (1990)
The Equinox Displaced, C.H. Bachman; **28**, 536 (1990)
A Few Lines on Physics, Joe Trueblood; **28**, 384 (1990)
Food, Eating, and Mathematical Scaling, George Barnes; **28**, 614 (1990)
The Grammar of Physics, P.R. Subramanian, B. Gnanapragasam, and G. Janhavi; **28**, 174 (1990)
How to Test Your PK Power, Martin Gardner; **28**, 228 (1990)
Meet Your New AAPT President: Judy Franz, Don Holcomb; **28**, 70 (1990)
The Physics of Firefighting, Robert A. Egler; **28**, 599 (1990)
Picking Up Pennies, Jay S. Huebner; **28**, 29 (1990)
Science Education in the Soviet Union, Sergey Chernyshev and Alexander Kusenko; **28**, 270 (1990)
Solar Zenith and Local Time from a Rainbow, A. Tan and Tom King; **28**, 224 (1990)
A Square that Ain't There, Martin Gardner; **28**, 562 (1990)
There Was a Professor from Troy..., Robert Resnick; **28**, 44 (1990)
Wave Interference Pattern from the Wings of a Bee, David R. Lapp; **28**, 335 (1990)
What Is Physics? David W. Nevins; **28**, 91, 225, 467 (1990)
Wisdom and Wonder, Jane Simonsen; **28**, 608 (1990)

NUMERICAL APPROXIMATION AND ANALYSIS
Numerical Calculation of Model Rocket Trajectories, David Keeports; **28**, 274 (1990)

COMPUTATIONAL TECHNIQUES
How to Split Hairs on Fermi Questions, David Chandler; **28**, 170 (1990)
Integer Solutions of $1/x + 1/y = 1/z$, Mark A. Heald; **28**, 617 (1990)
An Improved Computer Plotting Technique, Laurent Hodges; **28**, 318 (1990)
Monte Carlo Computer Simulation of a Rainbow, Donald Olson; **28**, 226 (1990)
A World Full of Oil, Albert A. Bartlett; **28**, 540 (1990)

OTHER TOPICS IN MATHEMATICAL METHODS IN PHYSICS
Food, Eating, and Mathematical Scaling, George Barnes; **28**, 614 (1990)

CLASSICAL MECHANICS OF DISCRETE SYSTEMS
Traction Force on Accelerated Rolling Bodies, Richard E. Berg; **28**, 600 (1990)
Inclined Plane on a Frictionless Surface, Margaret Stautberg Greenwood; **28**, 110 (1990)
The Train Left the Track, Albert A. Bartlett and J. Parker Lamb; **28**, 586 (1990)
Worlds within Worlds: An Introduction to Cellular Automata, Jeremiah P. Reilly and Nicholas B. Tufillaro; **28**, 88 (1990)

SPECIAL RELATIVITY
How Fast Are We Going? Mark M. Payne; **28**, 102 (1990)
The Jerk, T.R. Sandin; **28**, 36 (1990)

TOPICS ON GENERAL RELATIVITY AND GRAVITATION
Profound Results from Introductory Physics, Peter Kosso; **28**, 242 (1990)

KINETIC THEORY
Heating the Hard Way, Stephen Brusca; **28**, 240 (1990)

UNITS
Business Expects Schools to Teach Metrics, William Hooper; **28**, 120 (1990)
Teaching Units, Govind S. Khandelwal and W. Maurice Pritchard; **28**, 300 (1990)

MEASUREMENT STANDARDS, CALIBRATION
Measurements of Acceleration Due to Gravity, Bill Crummett; **28**, 291 (1990)

DETERMINATION OF FUNDAMENTAL CONSTANTS
Looking for Ghosts to Measure the Speed of Light, David Keeports; **28**, 398 (1990)
Measurements of Acceleration Due to Gravity, Bill Crummett; **28**, 291 (1990)

MASS AND DENSITY MEASUREMENT
Depth Dependence of Pressure, Daniel E. Beeker; **28**, 486 (1990)

VELOCITY, ACCELERATION, AND ROTATION MEASUREMENT
Magnetic Induction Experiment, Jhules A.M. Clack and Terrence P. Toepker; **28**, 236 (1990)
Measurements of Acceleration Due to Gravity, Bill Crummett; **28**, 291 (1990)
Profound Results from Introductory Physics, Peter Kosso; **28**, 242 (1990)
The Strobe Cannon, Richard S. Halada; **28**, 488 (1990)
The Tennis-Ball Bounce Test, Howard Brody; **28**, 407 (1990)
The Train Left the Track, Albert A. Bartlett and J. Parker Lamb; **28**, 586 (1990)

MEASUREMENT OF BASIC ELECTROMAGNETIC QUANTITIES
Magnetic Induction Experiment, Jhules A.M. Clack and Terrence P. Toepker; **28**, 236 (1990)

LABORATORY TECHNIQUES AND SAFETY
Speed of Sound in a Parking Lot, Jan Paul Dabrowski; **28**, 410 (1990)

TESTING EQUIPMENT
Newton's Yo-Yo, a Square Sprinkler, and a Disposable Battery Tester, H. Richard Crane; **28**, 569 (1990)
The Octopus and the Phasor, L. Ribaud and P.G. Mattocks; **28**, 160 (1990)

DISPLAY, RECORDING, AND INDICATING INSTRUMENTS
The Strobe Cannon, Richard S. Halada; **28**, 488 (1990)

TRANSDUCERS
Sampling the Weather in the Upper Atmosphere by Balloon, H. Richard Crane; **28**, 182 (1990)

OTHER TOPICS IN MEASUREMENT SCIENCE, GENERAL LABORATORY TECHNIQUES, AND INSTRUMENTATION SYSTEMS
An ADC Interface for the Apple II, P. Steven Leiker; **28**, 332 (1990)
The Coefficient of Kinetic Friction, Charles J. Reidl, Jr.; **28**, 402 (1990)
Speed of Sound in a Parking Lot, Jan Paul Dabrowski; **28**, 410 (1990)
The Tennis-Ball Bounce Test, Howard Brody; **28**, 407 (1990)

MECHANICAL INSTRUMENTS AND MEASUREMENT METHODS
A Long Precision Air Track, Fritz Schoch and Walter Winiger; **28**, 618 (1990)
Meter-Stick Mechanics, Joseph L. Spradley; **28**, 312 (1990)

THERMAL INSTRUMENTS AND TECHNIQUES
Measuring the Heat Produced by a Single Candle, William S. Wagner; **28**, 420 (1990)

ELECTRICAL INSTRUMENTS AND TECHNIQUES
The Octopus and the Phasor, L. Ribaud and P.G. Mattocks; **28**, 160 (1990)
Superconductivity—A New Demonstration, Judith Bransky; **28**, 392 (1990)

MAGNETIC INSTRUMENTS AND TECHNIQUES
Superconductivity—A New Demonstration, Judith Bransky; **28**, 392 (1990)

OTHER TOPICS IN SPECIALIZED INSTRUMENTATION
Sampling the Weather in the Upper Atmosphere by Balloon, H. Richard Crane; **28**, 182 (1990)
Superconductivity—A New Demonstration, Judith Bransky; **28**, 392 (1990)

RADIOACTIVITY AND ELECTROMAGNETIC TRANSITIONS
Illuminating Physics with Light Bulbs, Harvey S. Leff; 28, 30 (1990)

ATOMIC SPECTRA AND INTERACTIONS WITH PHOTONS
An Astronomical Illustration of the Zeeman Effect, Anthony J. Weitenbeck; **28**, 511 (1990)
Magnetic Field Inside a Hole in a Conductor, W.G. Delinger; **28**, 234 (1990)
A Simulation of the Hydrogen Spectrum, Zhao Jiu-ming; **28**, 596 (1990)

ELECTROSTATICS AND MAGNETOSTATICS
Coulomb's Law after the Christmas Party, Samaroo Deonarine; **28**, 607 (1990)
Cryogenic Pyroelectricity: Demonstrating a Newly Discovered Phenomenon in the Classroom, James D. Brownridge, Andrew J. Telesca, Carl R. Stannard, and Thomas P. O'Brien; **28**, 482 (1990)
Inexpensive Electrostatic Halos, Walter Roy Mellen; **28**, 612 (1990)
Magnet Symmetry and Newton's Third Law, Robert Chasnov and Louis Overcast; **28**, 112 (1990)
Misrepresentation or Misconception, Mario Iona; **28**, 184 (1990)
A Simpler Soft-Drink-Can Electroscope, Haym Kruglak; **28**, 620 (1990)
Static Electricity and Mylar, Harry Rheam; **28**, 103 (1990)
Van de Graaff Generators: Theory, Maintenance, and Belt Fabrication, Richard E. Berg; **28**, 281 (1990)

STEADY STATE ELECTROMAGNETIC FIELDS, ELECTROMAGNETIC INDUCTION
Electric Fields and Football Fields, Mark M. Payne; **28**, 563 (1990)
Magnetic Field Inside a Hole in a Conductor, W.G. Delinger; **28**, 234 (1990)
Magnetic Induction Experiment, Jhules A.M. Clack and Terrence P. Toepker; **28**, 236 (1990)

CIRCUIT THEORY
Misunderstandings of Electric Current, Robert P. Bauman and Saleh Adams; **28**, 334 (1990)

PARTICLES IN ELECTROMAGNETIC FIELDS
Standing Waves in a Microwave Oven, Alistair Steyn-Ross and Alister Riddell; **28**, 474 (1990)

CURRENTS AND CIRCUITS
Illuminating Physics with Light Bulbs, Harvey S. Leff; **28**, 30 (1990)
Integer Solutions of $1/x + 1/y = 1/z$, Mark A. Heald; **28**, 617 (1990)

OTHER TOPICS IN ELECTRICITY AND MAGNETISM
Determine the Magnetic Induction of a Coil with a Hall Element, An Zhong; **28**, 123 (1990)
"Iron-Enriched" Cereal—Literally, Evelyn Restivo and H.T. Hudson; **28**, 608 (1990)
The Lemon Screamer, the Lasagna Cell, and the Physics Teacher, Courtney W. Willis and Lois Nicholson; **28**, 329 (1990)
Magnetic Field Inside a Hole in a Conductor, W.G. Delinger; **28**, 234 (1990)
Measuring Magnetic Force and Magnetic Field of Small Permanent Magnets, J.L. Sandoval, A. Porta, and P. Segarra; **28**, 124 (1990)

WAVE FRONTS AND RAY TRACING
On Teaching Why a Rainbow Is Bowshaped, Paul G. Hewitt; **28**, 509 (1990)
Spots on the Lawn, Robert H. Romer; **28**, 326 (1990)
Using a Standard Force Table to Verify Snell's Law, George Shellenberger; **28**, 422 (1990)

DIFFRACTION AND SCATTERING FROM EXTENDED BODIES
Film-Canister Spectroscope, Edwin Paul Heideman; **28**, 343 (1990)
Which Side of the Grating Has the Grooves? Alfred F. Leung and Simon George; **28**, 98 (1990)

INTERFERENCE
Colors on Soap Films—An Interference Phenomenon, Göran Rämme; **28**, 479 (1990)
Compact Disc Diffraction, Christian Nöldeke; **28**, 484 (1990)

ABSORPTION
Sunglasses that Switch On and Off, John Harris and Vittorio Zanetti; **28**, 200 (1990)

POLARIZATION
How Does the Honeybee Sense Polarization? H. Richard Crane; **28**, 504 (1990)

OPTICAL INFORMATION, IMAGE FORMATION, AND ANALYSIS
Photography in the Classroom, Thomas B. Greenslade, Jr.; **28**, 148 (1990)
Thermal Imaging on a Grand Scale, Paul R. Camp; **28**, 552 (1990)

PHYSIOLOGICAL OPTICS, VISION
Another Legend Debunked, Haym Kruglak; **28**, 491 (1990)
Haidinger's Brush, Bill Reid; **28**, 598 (1990)

ATMOSPHERIC OPTICS
Monte Carlo Computer Simulation of a Rainbow, Donald Olson; **28**, 226 (1990)
Solar Zenith and Local Time from a Rainbow, A. Tan and Tom King; **28**, 224 (1990)

OPTICAL LENS AND MIRROR SYSTEMS
Heat-Wave Focusing by Concave Reflectors, Richard E. Berg; **28**, 56 (1990)
Integer Solutions of $1/x + 1/y = 1/z$, Mark A. Heald; **28**, 617 (1990)
The Mirror Equation, Govind S. Khandelwal and Wynford L. Harries; **28**, 299 (1990)
Ray Tracing with Spherical and Parabolic Reflectors, Samuel Derman; **28**, 590 (1990)
Teaching Geometrical Optics with the "Optic Mirage," Andrzej Sieradzan; **28**, 534 (1990)
TV Experiment: Velocity of Light, T.P. Zaleskiewicz; **28**, 116 (1990)

OPTICAL DEVICES, TECHNIQUES, AND APPLICATIONS
Ray Tracing with Spherical and Parabolic Reflectors, Samuel Derman; **28**, 590 (1990)
Sawblade Optics, Albert J. Read; **28**, 468 (1990)

OTHER TOPICS IN OPTICS
Lapping in Races as a Model for Beats, R.G. Newburgh; **28**, 557 (1990)
Ray Tracing with Spherical and Parabolic Reflectors, Samuel Derman; **28**, 590 (1990)
Style vs Optics, H.T. Hudson; **28**, 320 (1990)
A Tactile-Optical Illusion, Laurent Hodges; **28**, 300 (1990)

ULTRASONICS
Simple Corner Reflectors Improve Data from Sonic Motion Detectors, R.A. Morse; **28**, 423 (1990)

MECHANICAL VIBRATIONS AND SHOCK
Wine Glasses, Bell Modes, and Lord Rayleigh, Thomas D. Rossing; **28**, 582 (1990)

MUSIC AND MUSICAL INSTRUMENTS
PC and PVC Acoustics Demonstrations, Stephen Luzader; **28**, 459 (1990)
Wine Glasses, Bell Modes, and Lord Rayleigh, Thomas D. Rossing; **28**, 582 (1990)

ACOUSTICAL MEASUREMENTS AND INSTRUMENTATION
Speed of Sound in a Parking Lot, Jan Paul Dabrowski; **28**, 410 (1990)

OTHER TOPICS IN ACOUSTICS
Lapping in Races as a Model for Beats, R.G. Newburgh; **28**, 557 (1990)
Shattering Glass with Sound Simplified, Haym Kruglak, Robert Hiltbrand, and Don Kangas; **28**, 418 (1990)

CONVECTIVE AND CONSTRAINED HEAT TRANSFER
Measuring the Heat Produced by a Single Candle, William S. Wagner; **28**, 420 (1990)

RADIATIVE HEAT TRANSFER
Heat-Wave Focusing by Concave Reflectors, Richard E. Berg; **28**, 56 (1990)
Illuminating Physics with Light Bulbs, Harvey S. Leff; **28**, 30 (1990)
Jackrabbit Ears and Other Physics Problems, George Barnes; **28**, 156 (1990)

THERMAL PROPERTIES OF MATTER
Cryogenics, Floyd Holt and George Amann; **28**, 321 (1990)
Illuminating Physics with Light Bulbs, Harvey S. Leff; **28**, 30 (1990)
The Meaning of Temperature, Ralph Baierlein; **28**, 94 (1990)

THERMODYNAMIC PROCESSES
Calibration and Efficiency of Microwave Ovens, Ron Fritz; **28**, 564 (1990)

OPTICAL DEVICES, TECHNIQUES, AND APPLICATIONS
Illuminating Physics with Light Bulbs, Harvey S. Leff; **28**, 30 (1990)

OTHER TOPICS IN HEAT FLOW, THERMAL AND THERMODYNAMIC PROCESSES
Cryogenics, Floyd Holt and George Amann; **28**, 321 (1990)
The Stirling Engine—173 Years Old and Running, H. Richard Crane; **28**, 252 (1990)

TRANSLATIONAL KINEMATICS
A Demonstration of Car Braking Instabilities, Jack Irwin and Derek Swison; **28**, 522 (1990)
Experiments on Free Fall and Rebound, Herbert R. Bailey; **28**, 100 (1990)
The Jerk, T.R. Sandin; **28**, 36 (1990)
Meter-Stick Mechanics, Joseph L. Spradley; **28**, 312 (1990)

ROTATIONAL KINEMATICS
Amusement Park Physics, Carole Escobar; **28**, 446 (1990)
Cheap and Simple Yo-Yos, William Boudreau; **28**, 92 (1990)
The Flight of the Boomerang, Michael Hanson; **28**, 142 (1990)
Meter-Stick Mechanics, Joseph L. Spradley; **28**, 312 (1990)
Teacup Physics: Centripetal Acceleration, Channon P. Price; **28**, 49 (1990)

NEWTON'S LAWS OF MOTION
Aerodynamic Lifting Force, Klaus Weltner; **28**, 78 (1990)
Amusement Park Physics, Carole Escobar; **28**, 446 (1990)
Analysis of a Space Shuttle Launch, Jan Paul Dabrowski; **28**, 47 (1990)
Bernoulli's Law and Aerodynamic Lifting Force, Klaus Weltner; **28**, 84 (1990)
The Jerk, T.R. Sandin; **28**, 36 (1990)
Magnet Symmetry and Newton's Third Law, Robert Chasnov and Louis Overcast; **28**, 112 (1990)
Meter-Stick Mechanics, Joseph L. Spradley; **28**, 312 (1990)
Newton's Third Law at a Traffic Intersection, Ernie McFarland; **28**, 315 (1990)
Simple Variable Mass Systems: Newton's Second Law, J. Matolyak and G. Matous; **28**, 328 (1990)
TV Experiment: Center of Mass Motion, Mary Ethel Parrott; **28**, 190 (1990)

FORCES AND TORQUES
A Demonstration of Car Braking Instabilities, Jack Irwin and Derek Swinson; **28**, 522 (1990)
Hugo Physics, William R. Kubinec; **28**, 176 (1990)
Inertial Forces on an Overhead Projector, Ernie McFarland; **28**, 542 (1990)
The Jerk, T.R. Sandin; **28**, 36 (1990)
Meter-Stick Mechanics, Joseph L. Spradley; **28**, 312 (1990)

ROTATIONAL DYNAMICS
Centripetal Force on a Turntable, John E. Beach; **28**, 106 (1990)
The Falling Keys, Martin Gardner; **28**, 390 (1990)
The Foucault Pendulum As a Murder Weapon and a Physicist's Delight, H. Richard Crane; **28**, 264 (1990)
The Hammer Flip, Allan Walstad; **28**, 556 (1990)
Meter-Stick Mechanics, Joseph L. Spradley; **28**, 312 (1990)
The Moment of Inertia of Alex Meyer, Donald Maloney; **28**, 100 (1990)
The Train Left the Track, Albert A. Bartlett and J. Parker Lamb; **28**, 586 (1990)

MECHANICAL ENERGY, WORK, AND POWER
Conveyor-Belt Work, Displacement, and Dissipation, Harvey S. Leff; **28**, 172 (1990)
Pedagogical Interlude, Carl H. Hayn; **28**, 166 (1990)
Physics and a Skiing Record, Albert A. Bartlett; **28**, 72 (1990)
Power Transfer in Physical Systems, Jack A. Kaeck; **28**, 214 (1990)

ENERGY CONSERVATION
Amusement Park Physics, Carole Escobar; **28**, 446 (1990)
Inclined Plane on a Frictionless Surface, Margaret Stautberg Greenwood; **28**, 110 (1990)
Pedagogical Interlude, Carl H. Hayn; **28**, 166 (1990)

CENTER OF MASS AND CENTER OF GRAVITY
Demonstrations Video: Motion, David Koch; **28**, 190 (1990)
Dice with Parallelepiped Shapes, Patricia F. Bronson and Robert L. Bronson; **28**, 286 (1990)
Meter-Stick Mechanics, Joseph L. Spradley; **28**, 312 (1990)
A Not-So-Obvious Pendulum Experiment, Bruce Denardo and Richard Masada; **28**, 51 (1990)
The Wobbler, Ronald D. Edge; **28**, 122 (1990)

MOMENT OF INERTIA
Cheap and Simple Yo-Yos, William Boudreau; **28**, 92 (1990)
Meter-Stick Mechanics, Joseph L. Spradley; **28**, 312 (1990)
The Moment of Inertia of Alex Meyer, Donald Maloney; **28**, 100 (1990)
A Not-So-Obvious Pendulum Experiment, Bruce Denardo and Richard Masada; **28**, 51 (1990)

MECHANICS OF DISCRETE SYSTEMS
The Foucault Pendulum As a Murder Weapon and a Physicist's Delight, H. Richard Crane; **28**, 264 (1990)
Simple Variable Mass Systems: Newton's Second Law, J. Matolyak and G. Matous; **28**, 328 (1990)

ELASTIC AND INELASTIC COLLISIONS
Experiments on Free Fall and Rebound, Herbert R. Bailey; **28**, 100 (1990)

Hugo Physics, William R. Kubinec; **28**, 176 (1990)

STATIC ELASTICITY

An Elasticity Paradox, James E. Kettler; **28**, 416 (1990)

VISCOELASTICITY, PLASTICITY, STRESS RELAXATION, ETC.

Rubber Hysteresis Experiment, Bruce Denardo and Richard Masada; **28**, 489 (1990)

VIBRATIONS AND MECHANICAL WAVES

Catch the Wave, James Hicks and Chris Chiaverina; **28**, 167 (1990)

Harmonic Sliders, Thomas B. Greenslade, Jr.; **28**, 568 (1990)

A Not-So-Obvious Pendulum Experiment, Bruce Denardo and Richard Masada; **28**, 51 (1990)

Transverse Wave Machine, Thomas B. Greenslade, Jr.; **28**, 508 (1990)

Wave Speed on a String Revisited, Ray Scott Wakeland and Bennet Brabson; **28**, 57 (1990)

FRICTION

The Coefficient of Kinetic Friction, Charles J. Reidl, Jr.; **28**, 402 (1990)

A Science Friction Adventure, Craig W. Smith and Kenneth D. West; **28**, 301 (1990)

OTHER TOPICS IN MECHANICS, ELASTICITY, AND RHEOLOGY

The Foucault Pendulum As a Murder Weapon and a Physicist's Delight, H. Richard Crane; **28**, 264 (1990)

Inertial Forces on an Overhead Projector, Ernie McFarland; **28**, 542 (1990)

GENERAL THEORY IN FLUID DYNAMICS

Role of Viscous Resistance in Siphon Flow, Henry S. Badeer and James W. Hicks; **28**, 558 (1990)

LAMINAR FLOWS

Aerodynamic Lifting Force, Klaus Weltner; **28**, 78 (1990)

Bernoulli's Law and Aerodynamic Lifting Force, Klaus Weltner; **28**, 84 (1990)

Laminar and Turbulent Flow in a Glass Tube, Richard M. Heavers and Maria G. Medeiros; **28**, 297 (1990)

TURBULENT FLOWS, CONVECTION, AND HEAT TRANSFER

Laminar and Turbulent Flow in a Glass Tube, Richard M. Heavers and Maria G. Medeiros; **28**, 297 (1990)

Tempest in a Fruit Jar, Joseph Guidry and H.T. Hudson; **28**, 494 (1990)

FLOWS IN DUCTS, CHANNELS, AND CONDUITS

Laminar and Turbulent Flow in a Glass Tube, Richard M. Heavers and Maria G. Medeiros; **28**, 297 (1990)

OTHER TOPICS IN FLUID DYNAMICS

The "Quicker-Picker-Upper," Dominick F. Fanelli, Jeffrey I. Bubb, and Charles P. Bean; **28**, 548 (1990)

The Stones of Spring and Summer, David Miller Raybin; **28**, 500 (1990)

OTHER TOPICS IN THE PHYSICS OF FLUIDS

On the Difference between Fluids and Dried Beans, Rolf G. Winter; **28**, 104 (1990)

MECHANICAL AND ELASTIC WAVES

Wave Speed on a String Revisited, Ray Scott Wakeland and Bennet Brabson; **28**, 57 (1990)

EQUATIONS OF STATE, PHASE EQUILIBRIA, AND PHASE TRANSITIONS

Depth Dependence of Pressure, Daniel E. Beeker; **28**, 486 (1990)

THERMODYNAMIC EXPANSION AND THERMOMECHANICAL EFFECTS

Depth Dependence of Pressure, Daniel E. Beeker; **28**, 486 (1990)

OTHER TOPICS IN THERMAL PROPERTIES OF CONDENSED MATTER

Heat of Vaporization of Nitrogen, Albert W. Burgstahler and Peter Hamlet; **28**, 544 (1990)

Thermal Imaging on a Grand Scale, Paul R. Camp; **28**, 552 (1990)

SUPERCONDUCTIVITY

Cryogenics, Floyd Holt and George Amann; **28**, 321 (1990)

Teaching Superconductivity via Analogy, G.G. Ihas and M.W. Meisel; **28**, 554 (1990)

OPTICAL PROPERTIES AND MATERIALS

Illuminating Physics with Light Bulbs, Harvey S. Leff; **28**, 30 (1990)

Openings between Leaves, Paul G. Hewitt; **28**, 574 (1990)

Sunglasses that Switch On and Off, John Harris and Vittorio Zanetti; **28**, 200 (1990)

Three Colored Lamps, Paul G. Hewitt; **28**, 430 (1990)

OTHER INTERACTIONS OF MATTER WITH PARTICLES AND RADIATION

Standing Waves in a Microwave Oven, Alistair Steyn-Ross and Alister Riddell; **28**, 474 (1990)

ELECTRON TUBES

Standing Waves in a Microwave Oven, Alistair Steyn-Ross and Alister Riddell; **28**, 474 (1990)

SUPERCONDUCTING DEVICES

Levitation of a Magnet over a Superconductor, P.J. Ouseph; **28**, 205 (1990)

MAGNETIC DEVICES

Measuring Magnetic Force and Magnetic Field of Small Permanent Magnets, J.L. Sandoval, A. Porta, and P. Segarra; **28**, 124 (1990)

BIOPHYSICS, MEDICAL PHYSICS, AND BIOMEDICAL ENGINEERING

An Experiment on Area-to-Volume Ratios, George Barnes; **28**, 403 (1990)

Jackrabbit Ears and Other Physics Problems, George Barnes; **28**, 156 (1990)

HYDROSPHERIC AND ATMOSPHERIC GEOPHYSICS

Physics As an Integrative Theme in Oceanography, Richard L. Myers; **28**, 306 (1990)

OTHER AREAS OF GENERAL INTEREST TO PHYSICISTS

Hugo Physics, William R. Kubinec; **28**, 176 (1990)

The Stones of Spring and Summer, David Miller Raybin; **28**, 500 (1990)

Thermal Imaging on a Grand Scale, Paul R. Camp; **28**, 552 (1990)

FUNDAMENTAL ASTRONOMY

Another Legend Debunked, Haym Kruglak; **28**, 491 (1990)

Earth and Moon Motions Around Their Common Center of Mass, Charles A. Eckroth; **28**, 425 (1990)

How Much Energy Does a Star Radiate? Amos Harpaz; **28**, 526 (1990)

Slides: An Infrared View, William Luzader; **28**, 428 (1990)

Slides: Terrestrial Neighbors, James Watson and Nancy Watson; **28**, 54 (1990)

HISTORICAL AND ARCHAEOASTRONOMY

Women and the Stars, Joseph L. Spradley; **28**, 372 (1990)

ASTRONOMICAL OBSERVATIONS

An Astronomical Illustration of the Zeeman Effect, Anthony J. Weitenbeck; **28**, 511 (1990)

The Equinox Displaced, C.H. Bachman; **28**, 536 (1990)

OTHER TOPICS IN ASTRONOMY AND ASTROPHYSICS

Women and the Stars, Joseph L. Spradley; **28**, 372 (1990)

GENERAL TOPICS ON THE SOLAR SYSTEM

Slides: Halley's Comet and Supernova 1987A, John L. Roeder; **28**, 254 (1990)

GENERAL TOPICS ON STARS

How Much Energy Does a Star Radiate? Amos Harpaz; **28**, 526 (1990)

Women and the Stars, Joseph L. Spradley; **28**, 372 (1990)

Author Index—Volume 28

Adams, Saleh, Misunderstandings of Electric Current, Robert P. Bauman and Saleh Adams; **28**, 334 (1990)

Akridge, Russell, Cartoon Physics; **28**, 336 (1990)

Alonso, Marcelo, Comment I by Alonso (L); **28**, 441 (1990)

Amann, George, Cryogenics, Floyd Holt and George Amann; **28**, 321 (1990)

Andereck, Barbara S., Using Contour Maps to Teach Electric Field and Potential; **28**, 499 (1990)

Microwave Hot Spots (L); **28**, 580 (1990)

Austen, David, A Superconductivity Workshop, David Austen and Wytze Brouwer; **28**, 232 (1990)

Bachman, C.H., The Equinox Displaced; **28**, 536 (1990)

Badeer, Henry S., Role of Viscous Resistance in Siphon Flow, Henry S. Badeer and James W. Hicks; **28**, 558 (1990)

Baierlein, Ralph, The Meaning of Temperature; **28**, 94 (1990)

Baierlein's Response to Alonso and Munley (L); **28**, 442 (1990)

Bailey, Herbert R., Experiments on Free Fall and Rebound; **28**, 100 (1990)

Baker, Romona, Raising the *Titanic*; **28**, 597 (1990)

Barnes, George, Jackrabbit Ears and Other Physics Problems; **28**, 156 (1990)

An Experiment on Area-to-Volume Ratios; **28**, 403 (1990)

Food, Eating, and Mathematical Scaling; **28**, 614 (1990)

Bartlett, Albert A., et cetera; **28**, 60, 178, 255, 350, 429, 512, 576, 585, 593, 613, 620 (1990)

Physics and a Skiing Record; **28**, 72 (1990)

A World Full of Oil; **28**, 540 (1990)

The Train Left the Track, Albert A. Bartlett and J. Parker Lamb; **28**, 586 (1990)

Bauman, Robert P., Misunderstandings of Electric Current, Robert P. Bauman and Saleh Adams; **28**, 334 (1990)

Beach, John E., Centripetal Force on a Turntable; **28**, 106 (1990)

Bean, Charles P., The "Quicker-Picker-Upper," Dominick F. Fanelli, Jeffrey I. Bubb, and Charles P. Bean; **28**, 548 (1990)

Beeker, Daniel E., Depth Dependence of Pressure; **28**, 486 (1990)

Bellina, Joseph, Vivani's Life of Galileo, M. Segre, *Isis*, June 1989 (GR); **28**, 506 (1990)

Berg, Richard E., Heat-Wave Focusing by Concave Reflectors; **28**, 56 (1990)

More on the Third Derivative (L); **28**, 199 (1990)

Van de Graaff Generators: Theory, Maintenance, and Belt Fabrication; **28**, 281 (1990)

IMAGES: A New Physics Olympics Event; **28**, 400 (1990)

Traction Force on Accelerated Rolling Bodies; **28**, 600 (1990)

Biezeveld, Hubert N., Zero, maybe? (L); **28**, 134 (1990)

Boss, Judith E., Science Fiction Aids Science Teaching, Leroy W. Dubeck, Matthew H. Bruce, Joseph S, Schmuckler, Suzanne E. Moshier, and Judith E. Boss; **28**, 316 (1990)

Bouadana, Daria, Do Tell—In Writing (L); **28**, 68 (1990)

Boudreau, William, Cheap and Simple Yo-Yos; **28**, 92 (1990)

Brabson, Bennet, Wave Speed on a String Revisited, Ray Scott Wakeland and Bennet Brabson; **28**, 57 (1990)

Brace, Fred, Thought Questions; **28**, 349 (1990)

Bransky, Judith, Measurements of Sound Velocity by Means of PZT; **28**, 125 (1990)

Superconductivity—A New Demonstration; **28**, 392 (1990)

Brecher, Karen, The "VideoStrobe" Water Drop Gravimeter, Karen Brecher and Kenneth Brecher; **28**, 108 (1990)

Brecher, Kenneth, The "VideoStrobe" Water Drop Gravimeter, Karen Brecher and Kenneth Brecher; **28**, 108 (1990)

Brekke, Stewart E., Posters: Modern Physics; **28**, 349 (1990)

Brody, Howard, The Tennis-Ball Bounce Test; **28**, 407 (1990)

Bronk, Mitchell, On Matching Impedances (L); **28**, 362 (1990)

Bronson, Patricia F., Dice with Parallelepiped Shapes, Patricia F. Bronson and Robert L. Bronson; **28**, 286 (1990)

Bronson, Robert L., Dice with Parallelepiped Shapes, Patricia F. Bronson and Robert L. Bronson; **28**, 286 (1990)

Brouwer, Wytze, A Superconductivity Workshop, David Austen and Wytze Brouwer; **28**, 232 (1990)

Brownridge, James D., Cryogenic Pyroelectricity: Demonstrating a Newly Discovered Phenomenon in the Classroom, James D. Brownridge, Andrew J. Telesca, Carl R. Stannard, and Thomas P. O'Brien; **28**, 482 (1990)

Bruce, Matthew H., Science Fiction Aids Science Teaching, Leroy W. Dubeck, Matthew H. Bruce, Joseph S. Schmuckler, Suzanne E. Moshier, and Judith E. Boss; **28**, 316 (1990)

Brusca, Stephen, The Dynamic Aurora, S. Akasofu, *Sci. Am.*, May 1989 (GR); **28**, 118 (1990)

The New Superconductors: Prospects for Applications, A. Wolsky, R. Giese, and E. Daniels, *Sci. Am.*, Feb. 1989 (GR); **28**, 118 (1990)

Heating the Hard Way; **28**, 240 (1990)

Bubb, Jeffrey I., The "Quicker-Picker-Upper," Dominick F. Fanelli, Jeffrey I. Bubb, and Charles P. Bean; **28**, 548 (1990)

Burgstahler, Albert W., Heat of Vaporization of Nitrogen, Albert W. Burgstahler and Peter Hamlet; **28**, 544 (1990)

Camp, Paul R., Thermal Imaging on a Grand Scale; **28**, 552 (1990)

Chandler, David, How to Split Hairs on Fermi Questions; **28**, 170 (1990)

Chasnov, Robert, Magnet Symmetry and Newton's Third Law, Robert Chasnov and Louis Overcast; **28**, 112 (1990)

Chernyshev, Sergey, Science Education in the Soviet Union, Sergey Chernyshev and Alexander Kusenko; **28**, 270 (1990)

Chiaverina, Chris, Catch the Wave, James Hicks and Chris Chiaverina; **28**, 167 (1990)

A Laser Spirograph for Under $3 (Laser Not Included); **28**, 606 (1990)

Chu, Steven, Richtmyer Memorial Lecture: *Steven Chu*; **28**, 141 (1990)

Clack, Jhules A.M., Magnetic Induction Experiment, Jhules A.M. Clack and Terrence P. Toepker; **28**, 236 (1990)

Coker, David A., *The Discovery of Subatomic Particles*, S. Weinberg, W.H. Freeman, NY, 1990 (BR); **28**, 566 (1990)

Coombs, Earl, Demonstrating the Difference between Velocity and Acceleration; **28**, 546 (1990)

Court, James E., Caveat *Consumer Reports* (L); **28**, 135 (1990)

Crane, H. Richard, Sampling the Weather in the Upper Atmosphere by Balloon; **28**, 182 (1990)

The Stirling Engine—173 Years Old and Running; **28**, 252 (1990)

The Foucault Pendulum As a Murder Weapon and a Physicist's Delight; **28**, 264 (1990)

How Does the Honeybee Sense Polarization? **28**, 504 (1990)

Newton's Yo-Yo, a Square Sprinkler, and a Disposable Battery Tester; **28**, 569 (1990)

Crummett, Bill, Measurements of Acceleration Due to Gravity; **28**, 291 (1990)

Dabrowski, Jan Paul, Analysis of a Space Shuttle Launch; **28**, 47 (1990)

Speed of Sound in a Parking Lot; **28**, 410 (1990)

Davids, Mark, *The Beauty of Light*, B. Bova, Wiley, NY, 1988 (BR); **28**, 187 (1990)

Davies, G.R., Polarized Light Corridor Demonstrations; **28**, 464 (1990)

Davis, Lawrence C., Stopping the Action (L); **28**, 363 (1990)

DeBuvitz, William, The Importance of Scale Drawings; **28**, 604 (1990)

Dellinger, W.G., Magnetic Field Inside a Hole in a Conductor; **28**, 234 (1990)

Denardo, Bruce, A Not-So-Obvious Pendulum Experiment, Bruce Denardo and Richard Masada; **28**, 51 (1990)

Rubber Hysteresis Experiment, Bruce Denardo and Richard Masada; **28**, 489 (1990)

Deonarine, Samaroo, Coulomb's Law after the Christmas Party; **28**, 607 (1990)

Derman, Samuel, Ray Tracing with Spherical and Parabolic Reflectors; **28**, 590 (1990)

diSessa, Andrea A., Children Are Not Abstractions (L), David M. Hammer and Andrea A. diSessa; **28**, 440 (1990)

Dubeck, Leroy W., Science Fiction Aids Science Teaching, Leroy W. Dubeck, Matthew H. Bruce, Joseph S. Schmuckler, Suzanne E. Moshier, and Judith E. Boss; **28**, 316 (1990)

Eckroth, Charles A., Earth and Moon Motions Around Their Common Center of Mass; **28**, 425 (1990)

Edge, Ronald D., The Wobbler; **28**, 122 (1990)
Nobel Portraits (L); **28**, 134 (1990)
The Tumbling Toy; **28**, 341 (1990)
Battleship in the Bathtub; **28**, 510 (1990)
The Funny Physics Funnel; **28**, 575 (1990)

Edmiston, Michael D., Freezing Points (L); **28**, 260 (1990)

Egler, Robert A., Supernova Core Bounce: A Demonstration; **28**, 558 (1990)
The Physics of Firefighting; **28**, 599 (1990)

Ehrlich, Robert, Three Mechanical Demonstrations of Chaos; **28**, 26 (1990)
A Collection of Simple Physics Demonstrations; **28**, 492 (1990)

Ellenstein, Marshall, Movie Misconceptions; **28**, 246 (1990)

Ellisen, Raleigh, Chemistry in the Comics: Part 2. Classic Chemistry, H.A. Carter, *J. Chem. Educ.*, Feb. 1989 (GR); **28**, 118 (1990)
A Critic At Large: Besso, J. Bernstein, *The New Yorker*, Feb. 27, 1989 (GR); **28**, 118 (1990)
Musical Events, A. Porter, *The New Yorker*, May 1, 1989 (GR); **28**, 250 (1990)
Lise Meitner and the Discovery of Fission, R.L. Sime, *J. Chem. Educ.*, May 1989 (GR); **28**, 251 (1990)

Epstein, Lewis, Question on the Space Telescope Flaw (L); **28**, 580 (1990)

Escobar, Carole, Amusement Park Physics; **28**, 446 (1990)

Evans, Robert H., The Physics of Dinosaurs; **28**, 364 (1990)

Fanelli, Dominick F., The "Quicker-Picker-Upper," Dominick F. Fanelli, Jeffrey I. Bubb, and Charles P. Bean; **28**, 548 (1990)

Faucher, Guy, *Thematic Origins of Scientific Thought: Kepler to Einstein*, Rev. Ed., G. Holton, Harvard Univ. Press, Cambridge, MA, 1988 (BR); **28**, 345 (1990)

Feren, Richard B., *Wondering About Physics*, D.I. Dykstra, Jr., and R.G. Fuller, Wiley, NY, 1988 (BR); **28**, 59 (1990)

Ficken, George W., Jr., Better than We Thought (L); **28**, 580 (1990)

Finkel, Edward, *Superconductors: Conquering Technology's New Frontier*, R. Simon and A. Smith, Plenum Press, NY, 1988 (BR); **28**, 186 (1990)

Foland, William D., Annals of Radiation: The Hazards of Electromagnetic Fields, P. Brodeur, *The New Yorker*, June 12, 19, and 26, 1989 (GR); **28**, 250 (1990)

Frank, Michael T., Equations of Motion on a Computer Spreadsheet: The Damped Harmonic Oscillator and More, Michael T. Frank and Edward Kluk; **28**, 308 (1990)

Franklin, Bill, Physics Haiku; **28**, 180, 244, 463 (1990)

Franklin, George B., The Late Apex Turn (L); **28**, 68 (1990)

Franz, Judy, Has Anything Changed? **28**, 71 (1990)

Freier, George D., Lift and Flow (L); **28**, 518 (1990)

Fritz, Ron, Calibration and Efficiency of Microwave Ovens; **28**, 564 (1990)

Gardner, Martin, How to Test Your PK Power; **28**, 228 (1990)
PK Power in the Light of May; **28**, 296 (1990)
The Falling Keys; **28**, 390 (1990)
The Cartesian Matches; **28**, 478 (1990)
A Square that Ain't There; **28**, 562 (1990)

Garrett, John S., Modification of the Classic M & M® Decay Experiment; **28**, 611 (1990)

George, Simon, Which Side of the Grating Has the Grooves? Alfred F. Leung and Simon George; **28**, 98 (1990)

Gnanapragasam, B., The Grammar of Physics, P.R. Subramanian, B. Gnanapragasam, and G. Janhavi; **28**, 174 (1990)

Gram, Fredrick P., Physics for Technicians—A Systems Approach; **28**, 348 (1990)

Greenslade, Thomas B., Jr., Photography in the Classroom; **28**, 148 (1990)
The Prony Brake; **28**, 340 (1990)
Transverse Wave Machine; **28**, 508 (1990)
Harmonic Sliders; **28**, 568 (1990)

Greenwood, Margaret Stautberg, Inclined Plane on a Frictionless Surface; **28**, 110 (1990)

Gregory, Bruce, *Astronomy: The Cosmic Journey*, W.K. Hartmann, Wadsworth, Belmont, CA, 1989 (BR); **28**, 344 (1990)

Griffing, David F., Model for an Undergraduate Physics Problem, Joseph Priest and David F. Griffing; **28**, 210 (1990)

Guidry, Joseph, Tempest in a Fruit Jar, Joseph Guidry and H.T. Hudson; **28**, 494 (1990)

Halada, Richard S., The Strobe Cannon; **28**, 488 (1990)

Ham, Joe S., Systematic Errors in an Air Track Experiment, Santos A. Ramirez and Joe S. Ham; **28**, 602 (1990)

Hamlet, Peter, Heat of Vaporization of Nitrogen, Albert W. Burgstahler and Peter Hamlet; **28**, 544 (1990)

Hammer, David M., Children Are Not Abstractions (L), David M. Hammer and Andrea A. DiSessa; **28**, 440 (1990)

Hanson, Michael, The Flight of the Boomerang; **28**, 142 (1990)

Harkay, J. Russell, *A Bigger Bang*, J. Silk, Freeman, NY, 1989 (BR); **28**, 187 (1990)

Harpaz, Amos, How Much Energy Does a Star Radiate? **28**, 526 (1990)

Harries, Wynford L., The Mirror Equation, Govind S. Khandelwal and Wynford L. Harries; **28**, 299 (1990)

Harris, John, Sunglasses that Switch On and Off, John Harris and Vittorio Zanetti; **28**, 200 (1990)

Hartney, David T., Unexpected Result; **28**, 204 (1990)

Hayn, Carl H., Pedagogical Interlude; **28**, 166 (1990)

Heald, Mark A., Integer Solutions of $1/x + 1/y = 1/z$; **28**, 617 (1990)

Heavers, Richard M., Laminar and Turbulent Flow in a Glass Tube, Richard M. Heavers and Maria G. Medeiros; **28**, 297 (1990)

Heckathorn, Dick, Retraining Teachers in Physics, John D. McGervey and Dick Heckathorn; **28**, 230 (1990)

Heideman, Edwin Paul, Film-Canister Spectroscope; **28**, 343 (1990)

Hershey, David R., Unrealistic Example (L); **28**, 260 (1990)

Hetzel, Robert, Native American School Environments: Focus on Science and Mathematics Education, F. Lawrenz and H. McCreath, *Sch. Sci. & Math.*, Dec. 1988 (GR); **28**, 119 (1990)
Getting Them Unstuck: Some Strategies for the Teaching of Reading in Science, J. Walker, *Sch. Sci. & Math.*, Feb. 1989 (GR); **28**, 251 (1990)
Sex Differences in Mathematics Achievement: An Emerging Case for Physiological Factors, L. Morrison and E. Rudisill, *Sch. Sci. & Math.*, Nov. 1989 (GR); **28**, 506 (1990)
Mathematical Achievement: Equating the Sexes, R.A. Hensel, *Sch. Sci. & Math.*, Dec. 1989 (GR); **28**, 572 (1990)

Hewitt, Paul, Van de Graaff Generator; **28**, 113 (1990)
Laser Light; **28**, 192 (1990)
"Dork," Not "Jerk" (L); **28**, 199 (1990)
Small Iron Ball; **28**, 248 (1990)
Flexible Plastic Bottle; **28**, 352 (1990)
Three Colored Lamps; **28**, 430 (1990)
On Teaching Why a Rainbow Is Bowshaped; **28**, 509 (1990)
Openings between Leaves; **28**, 574 (1990)

Hicks, James, Catch the Wave, James Hicks and Chris Chiaverina; **28**, 167 (1990)

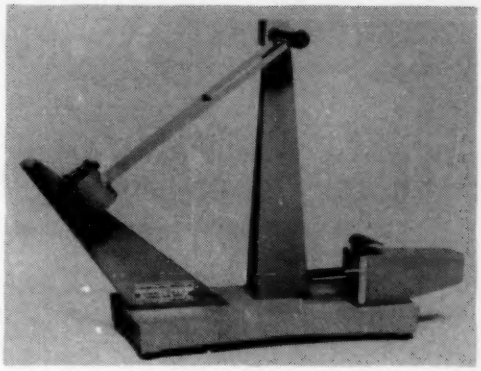
Hicks, James W., Role of Viscous Resistance in Siphon Flow, Henry S. Badeer and James W. Hicks; **28**, 558 (1990)
Hilborn, Robert C., Physics Carols; **28**, 609 (1990)
Hiltbrand, Robert, Shattering Glass with Sound Simplified, Haym Kruglak, Robert Hiltbrand, and Don Kangas; **28**, 418 (1990)
Hitchcock, John, On the Teaching of Physics; **28**, 342 (1990)
Hobbs, M., Where There's Smoke There's—a Bee Smoker? M. Hobbs and C. Roddy; **28**, 420 (1990)
Hodges, Laurent, A Tactile-Optical Illusion; **28**, 300 (1990)
An Improved Computer Plotting Technique; **28**, 318 (1990)
Hoff, Darrel, *Horizons*, M.A. Seeds, Wadsworth Pub. Co., Belmont, CA, 1989 (BR); **28**, 347 (1990)
Holcomb, Donald F., Meet Your New AAPT President: Judy Franz; **28**, 70 (1990)
Holt, Floyd, Cryogenics, Floyd Holt and George Amann; **28**, 321 (1990)
Hooper, William, Business Expects Schools to Teach Metrics; **28**, 120 (1990)
Metrication Is Alive in the United States; **28**, 507 (1990)
Hubisz, John L., Jr., Distinguished Service Citation: *John L. Hubisz, Jr.*; **28**, 139 (1990)
Planets Beyond: Discovering the Outer Solar System, M. Littmann, Wiley, NY, 1988 (BR); **28**, 249 (1990)
Hudson, H.T., *Rules of Thumb for Physical Scientists*, D.J. Fisher, Trans Tech Publications, Brookfield, VT, 1987 (BR); **28**, 187 (1990)
Style vs Optics; **28**, 320 (1990)
Tempest in a Fruit Jar, Joseph Guidry and H.T. Hudson; **28**, 494 (1990)
"Iron-Enriched" Cereal—Literally, Evelyn Restivo and H.T. Hudson; **28**, 608 (1990)
Huebner, Jay S., Picking Up Pennies; **28**, 29 (1990)
Ihas, G.G., Teaching Superconductivity via Analogy, G.G. Ihas and M.W. Meisel; **28**, 554 (1990)
Iona, Mario, The Column Editor Replies (L); **28**, 7 (1990)
Artistic Blunders; **28**, 116 (1990)
Misrepresentation or Misconception; **28**, 184 (1990)
Shooting with a Laser Gun (L); **28**, 361 (1990)
Another View by Iona (L); **28**, 444 (1990)
Density; **28**, 570 (1990)
Irwin, Jack, A Demonstration of Car Braking Instabilities, Jack Irwin and Derek Swinson; **28**, 522 (1990)
Janhavi, G., The Grammar of Physics, P.R. Subramanian, B. Gnanapragasam, and G. Janhavi; **28**, 174 (1990)
Johnson, Gary P., Magnetic Field Visualization on the Overhead Projector; **28**, 244 (1990)
Johnston, Karen L., Distinguished Service Citation: *Karen L. Johnston*; **28**, 139 (1990)
Kaeck, Jack A., Power Transfer in Physical Systems; **28**, 214 (1990)
Kahn, Peter B., *Introductory Mathematics through Science and Applications*, J. Berry, A. Norcliffe, and S. Humble, Cambridge Univ. Press, NY, 1989 (BR); **28**, 426 (1990)
Kangas, Don, Shattering Glass with Sound Simplified, Haym Kruglak, Robert Hiltbrand, and Don Kangas; **28**, 418 (1990)
Keefer, Robert K.F., So What Else Can You Do with a Ballistic Pendulum? **28**, 495 (1990)
Keeports, David, Numerical Calculation of Model Rocket Trajectories; **28**, 274 (1990)
Looking for Ghosts to Measure the Speed of Light; **28**, 398 (1990)
Kernell, R. Lee, Mixed CGS and MKS Units in Gas Constant, Govind S. Khandelwal and R. Lee Kernell; **28**, 246 (1990)
Kernohan, James C., *Particle Physics in the Cosmos*, ed. by R.A. Carrigan, Jr., and W.P. Trower, W.H. Freeman, NY, 1989 (BR); **28**, 345 (1990)
Kess, Joseph, Concepts in Force and Motion, Nanjundiah Sadanand and Joseph Kess; **28**, 530 (1990)
Kettler, James E., An Elasticity Paradox; **28**, 416 (1990)
Khandelwal, Govind S., Mixed CGS and MKS Units in Gas Constant, Govind S. Khandelwal and R. Lee Kernell; **28**, 246 (1990)
The Mirror Equation, Govind S. Khandelwal and Wynford L. Harries; **28**, 299 (1990)
Teaching Units, Govind S. Khandelwal and W. Maurice Pritchard; **28**, 300 (1990)
Kincanon, Eric, Juggling and the Theorist; **28**, 221 (1990)
King, Tom, Solar Zenith and Local Time from a Rainbow, A. Tan and Tom King; **28**, 224 (1990)
Kluk, Edward, Equations of Motion on a Computer Spreadsheet: The Damped Harmonic Oscillator and More, Michael T. Frank and Edward Kluk; **28**, 308 (1990)
Koch, David, Demonstrations Video: Motion; **28**, 190 (1990)
Kosso, Peter, Profound Results from Introductory Physics; **28**, 242 (1990)
Krieger, Michael E., Spreadsheets in the Physics Laboratory, Michael E. Krieger and James H. Stith; **28**, 378 (1990)
Kruglak, Haym, Shattering Glass with Sound Simplified, Haym Kruglak, Robert Hiltbrand, and Don Kangas; **28**, 418 (1990)
Another Legend Debunked; **28**, 491 (1990)
A Simpler Soft-Drink-Can Electroscope; **28**, 620 (1990)
Kubinec, William R., Hugo Physics; **28**, 176 (1990)
Kusenko, Alexander, Science Education in the Soviet Union, Sergey Chernyshev and Alexander Kusenko; **28**, 270 (1990)
Kutliroff, David, No April Fool (L); **28**, 363 (1990)
Lamb, J. Parker, The Train Left the Track, Albert A. Bartlett and J. Parker Lamb; **28**, 586 (1990)
Langabee, Joanne, A "Fun" Semester Final; **28**, 304 (1990)
Lapp, David R., Wave Interference Pattern from the Wings of a Bee; **28**, 335 (1990)
Larson, Roger F., Computer-Generated Interference Patterns; **28**, 336 (1990)
Leff, Harvey S., Illuminating Physics with Light Bulbs; **28**, 30 (1990)
Conveyor-Belt Work, Displacement, and Dissipation; **28**, 172 (1990)
Leiker, P. Steven, An ADC Interface for the Apple II; **28**, 332 (1990)
Leung, Alfred F., Which Side of the Grating Has the Grooves? Alfred F. Leung and Simon George; **28**, 98 (1990)
Levitt, Paul M., Peer Perspectives II: The Professor-Student's View; **28**, 457 (1990)
Liming, Glenn, A Graduate Research Model for Talented High-School Students; **28**, 412 (1990)
Liston, John, Through a Crystal Ball Darkly (L); **28**, 199 (1990)
Lockwood, Jeffrey F., Project Bluebook Revisited; **28**, 469 (1990)
Loomer, Jerry E., Trying Times: Cost of Remodeling SSC Causes Texans to Circle Their Wagons, SSC Design Revisions Call for Thinner Beams and Fatter Magnets, and Hunter Departs DOE after Riling Key Lawmakers and Top Texans, *Phys. Today*, Jan. 1990 (GR); **28**, 572 (1990)
Luzader, Stephen, PC and PVC Acoustics Demonstrations; **28**, 459 (1990)
Luzader, William, Slides: An Infrared View; **28**, 428 (1990)
Magnusson, Bengt, Relabel Your Diagram (L), Bengt Magnusson and Bruce Tiemann; **28**, 199 (1990)
Mak, Se-Yuen, A Quick Method to Measure the Density of Air, Se-yuen Mak and Zhu E-Qing; **28**, 406 (1990)
Maloney, David P., Forces As Interactions; **28**, 386 (1990)
Maloney, Donald, The Moment of Inertia of Alex Meyer; **28**, 100 (1990)
Masada, Richard, A Not-So-Obvious Pendulum Experiment, Bruce Denardo and Richard Masada; **28**, 51 (1990)
Rubber Hysteresis Experiment, Bruce Denardo and Richard Masada; **28**, 489 (1990)
Mathieson, D.L., Why Round the Answer? **28**, 471 (1990)
Matolyak, J., Simple Variable Mass Systems: Newton's Second Law, J. Matolyak and G. Matous; **28**, 328 (1990)
Matous, G., Simple Variable Mass Systems: Newton's Second Law, J. Matolyak and G. Matous; **28**, 328 (1990)
Mattocks, P.G., The Octopus and the Phasor, L. Ribaud and P.G.

Mattocks; 28, 160 (1990)
McClain, John, The Grammar of Force (L); 28, 519 (1990)
McClelland, Gerry, Some Nice Distinctions (L); 28, 134 (1990)
McFarland, Ernie, Newton's Third Law at a Traffic Intersection; 28, 315 (1990)
Inertial Forces on an Overhead Projector; 28, 542 (1990)
McGahan, James, Collapsing Soda Cans and Efficiency; 28, 550 (1990)
McGervey, John D., Retraining Teachers in Physics, John D. McGervey and Dick Heckathorn; 28, 230 (1990)
McIntosh, Gordon C., A Simple Resonance Demonstration; 28, 417 (1990)
McNulty, Dennis, The Twelve Days of Newton; 28, 581 (1990)
Medeiros, Maria G., Laminar and Turbulent Flow in a Glass Tube, Richard M. Heavers and Maria G. Medeiros; 28, 297 (1990)
Meisel, M.W., Teaching Superconductivity via Analogy, G.G. Ihas and M.W. Meisel; 28, 554 (1990)
Mellen, Walter Roy, Inexpensive Electrostatic Halos; 28, 612 (1990)
Miles, Carol L., Blink-Rate Effect (L); 28, 134 (1990)
Miner, Thomas D., *Reading the Mind of God*, J. Trefil, Scribner's, NY, 1989 (BR); 28, 186 (1990)
Physics Lore; 28, 338, 400, 480, 498, 571 (1990)
The Scientific Companion, C. Emiliani, Wiley, NY, 1988 (BR); 28, 344 (1990)
A Guide to Introductory Physics Teaching, A.B. Arons, Wiley, NY, 1990 (BR); 28, 426 (1990)
On the Glassy Sea: As Astronomer's Journey, T. Gehreis, American Institute of Physics, NY, 1988 (BR); 28, 566 (1990)
Mitchell, Walter E., Jr., Speeding Up the Foucault Pendulum (L); 28, 362 (1990)
Morse, R.A., Simple Corner Reflectors Improve Data from Sonic Motion Detectors; 28, 423 (1990)
Moshier, Suzanne E., Science Fiction Aids Science Teaching, Leroy W. Dubeck, Matthew H. Bruce, Joseph S. Schmuckler, Suzanne E. Moshier, and Judith E. Boss; 28, 316 (1990)
Munley, Frank, Comment II by Munley (L); 28, 441 (1990)
Myers, Richard L., Physics As an Integrative Theme in Oceanography; 28, 306 (1990)
Neff, Robert F., Rather Than Just Debunking, Encourage People to Think, A. Seckel, *The Skeptical Enquirer*, Spring, 1989 (GR); 28, 118 (1990)
Richard Feynman on Fringe Science, R. Feynman, *The Skeptical Inquirer*, Fall 1989 (GR); 28, 250 (1990)
Power Play, D. Noland, *Discover*, Dec. 1989 (GR); 28, 506 (1990)
Global Warming (in three parts), A. Fisher, *Pop. Sci.*, Aug. 1989, Sept. 1989, and Oct. 1989 (GR); 28, 506 (1990)
Science in the USSR, Nov.–Dec. 1989 (GR); 28, 506 (1990)
Submarine Power Lines, D. Scott, *Pop. Sci.*, Feb. 1990 (GR); 28, 572 (1990)
One Quantum Step, H.C. von Baeyer, *Discover*, June 1990 (GR); 28, 573 (1990)
Nevins, David W., What is Physics? 28, 91, 225, 467 (1990)
Newburgh, R.G., Lapping in Races as a Model for Beats; 28, 557 (1990)
Nicholson, Lois, The Lemon Screamer, the Lasagna Cell, and the Physics Teacher, Courtney W. Willis and Lois Nicholson; 28, 329 (1990)
Nicolo, Eugene, *The Facts on File Dictionary of Physics, Revised and Expanded Edition*, ed. by J. Daintith, Facts on File Publications, NY, 1988 (BR); 28, 59 (1990)
Technical Physics, R.E. Bigliani and G. Ferrigno, PWS-Kent Publishing Co., Boston, 1989 (BR); 28, 345 (1990)
Nöldeke, Christian, Compact Disc Diffraction; 28, 484 (1990)
O'Brien, Thomas P., Cryogenic Pyroelectricity: Demonstrating a Newly Discovered Phenomenon in the Classroom, James D. Brownridge, Andrew J. Telesca, Carl R. Stannard, and Thomas P. O'Brien; 28, 482 (1990)
Olson, Donald, Monte Carlo Computer Simulation of a Rainbow; 28, 226 (1990)
Pepys's Account of Levitation (L), Donald W. Olson and Marilynn S. Olson; 28, 261 (1990)
Olson, Marilynn S., Pepys's Account of Levitation (L), Donald W. Olson and Marilynn S. Olson; 28, 261 (1990)
Ouseph, P.J., Levitation of a Magnet over a Superconductor; 28, 205 (1990)
Overcast, Louis, Magnet Symmetry and Newton's Third Law, Robert Chasnov and Louis Overcast; 28, 112 (1990)
Padgett, Wendy T., *How to Solve Problems: For Success in Freshman Physics, Engineering, and Beyond*, D. Scarl, Dosoris Press, NY, 1989 (BR); 28, 346 (1990)
Palmer, E. Samuel, *Asteroids: Their Nature and Utilization*, C.T. Kowal, Ellis Horwood Ltd., Chichester, England, 1988, distrib. by Halsted Press, a division of Wiley, NY (BR); 28, 346 (1990)
Parrott, Mary Ethel, TV Experiment: Center of Mass Motion; 28, 190 (1990)
TV Experiments—Magnetic Fields; 28, 254 (1990)
Payne, Mark M., How Fast Are We Going? 28, 102 (1990)
More on Matching Impedances (L); 28, 362 (1990)
Electric Fields and Football Fields; 28, 563 (1990)
Peters, Philip C., Distinguished Service Citation: *Philip C. Peters*; 28, 140 (1990)
Peters, Randall D., Traveling Wave Pedagogy Using an Oscilloscope; 28, 337 (1990)
Phillips, Dennis W., Science Friction Adventure—Part II; 28, 553 (1990)
Physics Lore, Thomas D. Miner; 28, 338, 400, 480, 498, 571 (1990)
Pitre, John M., Lightwave Communication Apparatus for the Classroom, John M. Pitre, Paul Sharpe, and Richard Tasgal; 28, 560 (1990)
Porta, A., Measuring Magnetic Force and Magnetic Field of Small Permanent Magnets, J.L. Sandoval, A. Porta, and P. Segarra; 28, 124 (1990)
Potts, Larry, Computer Analysis of a Physical Pendulum, Joseph Priest and Larry Potts; 28, 413 (1990)
Preece, Betty P., Posters in Cartoon Form; 28, 54 (1990)
Pregger, Fred T., Further Observations of Hugo (L); 28, 363 (1990)
Price, Channon P., Teacup Physics: Centripetal Acceleration; 28, 49 (1990)
Priest, Joseph, Model for an Undergraduate Physics Problem, Joseph Priest and David F. Griffing; 28, 210 (1990)
Computer Analysis of a Physical Pendulum, Joseph Priest and Larry Potts; 28, 413 (1990)
Pritchard, W. Maurice, Teaching Units, Govind S. Khandelwal and W. Maurice Pritchard; 28, 300 (1990)
Ramirez, Santos A., Systematic Errors in an Air Track Experiment, Santos A. Ramirez and Joe S. Ham; 28, 602 (1990)
Ramirez-Bon, R., An Interesting Problem Solved by Vectors; 28, 594 (1990)
Rämme, Göran, Colors on Soap Films—An Interference Phenomenon; 28, 479 (1990)
Raybin, David Miller, The Stones of Spring and Summer; 28, 500 (1990)
Read, Albert J., Sawblade Optics; 28, 468 (1990)
Rehberger, Phillip J., *Electronics for Physics Experiments Using the Apple II Computer*, J.W. Snider and J. Priest, Addison-Wesley, Reading, MA, 1989 (BR); 28, 188 (1990)
Reid, Bill, Haidinger's Brush; 28, 598 (1990)
Reidl, Charles J., Jr., The Coefficient of Kinetic Friction; 28, 402 (1990)
Reilly, Jeremiah P., Worlds within Worlds: An Introduction to Cellular Automata, Jeremiah P. Reilly and Nicholas B. Tufillaro; 28, 88 (1990)
Resnick, Robert, There Was a Professor from Troy...; 28, 44 (1990)
1990 Oersted Medal: *Carl Sagan*; 28, 138 (1990)
Distinguished Service Citations: *John L. Hubisz, Jr., Karen L. Johnston, Philip C. Peters, Roger H. Stuewer, and Howard G. Voss*; 28, 139 (1990)
Richtmyer Memorial Lecture: *Steven Chu*; 28, 141 (1990)

Restivo, Evelyn, "Iron-Enriched" Cereal—Literally, Evelyn Restivo and H.T. Hudson; **28,** 608 (1990)
Revere, Ron, A Newton Fest; **28,** 609 (1990)
Rheam, Harry, Static Electricity and Mylar; **28,** 103 (1990)
Ribaud, L., The Octopus and the Phasor, L. Ribaud and P.G. Mattocks; **28,** 160 (1990)
Riddell, Alister, Standing Waves in a Microwave Oven, Alistair Steyn-Ross and Alister Riddell; **28,** 474 (1990)
Roddy, C., Where There's Smoke There's—a Bee Smoker? M. Hobbs and C. Roddy; **28,** 420 (1990)
Roeder, John L., The Global Impact of the Chernobyl Reactor Accident, L.R. Anspaugh, R.J. Catlin, and M. Goldman, *Science*, Dec. 16, 1988 (GR); **28,** 119 (1990)
Space Reactors Hinder Gamma Ray Astronomy, M.M. Waldrop, *Science*, Nov. 25, 1988 (GR); **28,** 119 (1990)
The Quantum Wave Function of the Universe, M.M. Waldrop, *Science*, Dec. 2, 1988 (GR); **28,** 119 (1990)
Quantum Chaos: Enigma Wrapped in a Mystery, R. Pool, *Science*, Feb. 17, 1989 (GR); **28,** 120 (1990)
The First High-Energy Neutrino Experiment, M. Schwartz, *Science*, Mar. 17, 1989 (GR); **28,** 250 (1990)
Observations in Particle Physics from Two Neutrinos to the Standard Model, L.M. Lederman, *Science*, May 12, 1989 (GR); **28,** 250 (1990)
Experiments with High-Energy Neutrino Beams, J. Steinberger, *Science*, Sept. 15, 1989 (GR); **28,** 250 (1990)
Slides: Halley's Comet and Supernova 1987A; **28,** 254 (1990)
Gravitational Lens Optics, R.D. Blandford, C.S. Kochanek, I. Kovner, and R. Narayan, *Science*, Aug. 25, 1989 (GR); **28,** 314 (1990)
Natural and Artificially Initiated Lightning, M.A. Uman and E.P. Krider, *Science*, Oct. 27, 1989 (GR); **28,** 506 (1990)
Academy Panel Raises Radiation Risk Estimate, E. Marshall, *Science*, Jan. 5, 1990 (GR); **28,** 572 (1990)
Prediction and Theory Evaluation, S.G. Brush, *Science*, Dec. 1, 1989 (GR); **28,** 572 (1990)
Paleomagnetism and the Nature of the Geodynamo, R.T. Merrill and P.L. McFadden, *Science*, April 20, 1990 (GR); **28,** 573 (1990)
Experiments on the Structure of an Individual Elementary Particle, H. Dehmelt, *Science*, Feb. 2, 1990 (GR); **28,** 573 (1990)
A Small Revolution Gets Under Way, R. Pool, *Science*, Jan. 5, 1990 (GR); **28,** 573 (1990)
Laser Cooling Hits New Low, R. Pool, *Science*, June 1, 1990 (GR); **28,** 573 (1990)
Romer, Robert H., Covering the U.S.A.: Exponential Growth of Railroad Tracks; **28,** 46 (1990)
Spots on the Lawn; **28,** 326 (1990)
Rossing, Thomas D., Wine Glasses, Bell Modes, and Lord Rayleigh; **28,** 582 (1990)
Russell, John J., *Energy and Problems of a Technical Society*, Revised Ed., J.J. Kraushaar and R.A. Ristinen, Wiley, NY, 1988 (BR); **28,** 188 (1990)
Sadanand, Nanjundiah, Concepts in Force and Motion, Nanjundiah Sadanand and Joseph Kess; **28,** 530 (1990)
Sagan, Carl, 1990 Oersted Medal: *Carl Sagan*; **28,** 138 (1990)
Sandin, T.R., The Jerk; **28,** 36 (1990)
Sandoval, J.L., Measuring Magnetic Force and Magnetic Field of Small Permanent Magnets, J.L. Sandoval, A. Porta, and P. Segarra; **28,** 124 (1990)
Schmuckler, Joseph S., Science Fiction Aids Science Teaching, Leroy W. Dubeck, Matthew H. Bruce, Joseph S. Schmuckler, Suzanne E. Moshier, and Judith E. Boss; **28,** 316 (1990)
Schoch, Fritz, A Long Precision Air Track, Fritz Schoch and Walter Winiger; **28,** 618 (1990)
Segarra, P., Measuring Magnetic Force and Magnetic Field of Small Permanent Magnets, J.L. Sandoval, A. Porta, and P. Segarra; **28,** 124 (1990)
Se-yuen, Mak, A Quick Method to Measure the Density of Air, Se-yuen Mak and Zhu E-Qing; **28,** 406 (1990)
Sharpe, Paul, Lightwave Communication Apparatus for the Classroom, John M. Pitre, Paul Sharpe, and Richard Tasgal; **28,** 560 (1990)
Shea, Mary Ann, Peer Perspectives I: The Teachers' Story, Mary Ann Shea and John R. Taylor; **28,** 454 (1990)
Shellenberger, George, Using a Standard Force Table to Verify Snell's Law; **28,** 422 (1990)
Sherfinski, John, A Modest Proposal; **28,** 424 (1990)
Shymansky, James A., Dr. Shymansky Answers His Critic (L); **28,** 6 (1990)
Sieradzan, Andrzej, Teaching Geometrical Optics with the "Optic Mirage"; **28,** 534 (1990)
Simonsen, Jane, Wisdom and Wonder; **28,** 608 (1990)
Smith, Craig W., A Science Friction Adventure, Craig W. Smith and Kenneth D. West; **28,** 301 (1990)
Snyder, Donald D., Video Series: Review of Preview Film; **28,** 114 (1990)
Southworth, Tom, Potential Energy Analysis of a Bow; **28,** 42 (1990)
Spradley, Joseph L., Meter-Stick Mechanics; **28,** 312 (1990)
Women and the Stars; **28,** 372 (1990)
Stankevitz, James, A Plumb Line to the Sun, T. Ferris, *Mercury*, May–June 1989 (GR); **28,** 314 (1990)
Voyager at Neptune—A Preliminary Report, W.J. Kaufmann, *Mercury*, Nov.–Dec. 1989 (GR); **28,** 572 (1990)
Stannard, Carl R., Cryogenic Pyroelectricity: Demonstrating a Newly Discovered Phenomenon in the Classroom, James D. Brownridge, Andrew J. Telesca, Carl R. Stannard, and Thomas P. O'Brien; **28,** 482 (1990)
Steyn-Ross, Alistair, Whither Jack's Beanstalk? (L); **28,** 134 (1990)
Standing Waves in a Microwave Oven, Alistair Steyn-Ross and Alister Riddell; **28,** 474 (1990)
Stith, James H., Spreadsheets in the Physics Laboratory, Michael E. Krieger and James H. Stith; **28,** 378 (1990)
Stuewer, Roger H., Distinguished Service Citation: *Roger H. Stuewer*; **28,** 140 (1990)
Subramanian, P.R., The Grammar of Physics, P.R. Subramanian, B. Gnanapragasam, and G. Janhavi; **28,** 174 (1990)
Swartz, Clifford E., Editor's Note; **28,** 6 (1990)
How to Win the Science Project Contest; **28,** 10 (1990)
Impedance Matching; **28,** 136 (1990)
An Elementary Proposal for Elementary-School Science; **28,** 198 (1990)
90° Erratum; **28,** 261 (1990)
Judgment Day; **28,** 262 (1990)
Judicious Hoopla; **28,** 360 (1990)
Just-In-Time Education; **28,** 438 (1990)
On the Meaning of Temperature: Editor's Note; **28,** 441 (1990)
We Need Each Other; **28,** 520 (1990)
Q and the December Centerfold; **28,** centerfold (1990)
Swartz, Paul, Gold Star Bonus (L); **28,** 440 (1990)
Swinson, Derek, A Demonstration of Car Braking Instabilities, Jack Irwin and Derek Swinson; **28,** 522 (1990)
Tam, Patrick, Review of "Essence of Physics"; **28,** 616 (1990)
Tan, A., Solar Zenith and Local Time from a Rainbow, A. Tan and Tom King; **28,** 224 (1990)
Tasgal, Richard, Lightwave Communication Apparatus for the Classroom, John M. Pitre, Paul Sharpe, and Richard Tasgal; **28,** 560 (1990)
Taylor, John R., Peer Perspectives I: The Teachers' Story, Mary Ann Shea and John R. Taylor; **28,** 454 (1990)
Telesca, Andrew J., Cryogenic Pyroelectricity: Demonstrating a Newly Discovered Phenomenon in the Classroom, James D. Brownridge, Andrew J. Telesca, Carl R. Stannard, and Thomas P. O'Brien; **28,** 482 (1990)
Tiemann, Bruce, Relabel Your Diagram (L), Bengt Magnusson and Bruce Tiemann; **28,** 199 (1990)

Tillotson, Kevin J., Who Will Win the Race, II? **28**, 537 (1990)
Toepker, Terrence P., Magnetic Induction Experiment, Jhules A.M. Clack and Terrence P. Toepker; **28**, 236 (1990)
Trueblood, Joe, A Few Lines on Physics; **28**, 384 (1990)
Tufillaro, Nicholas B., Worlds within Worlds: An Introduction to Cellular Automata, Jeremiah P. Reilly and Nicholas B. Tufillaro; **28**, 88 (1990)
Ukens, Leon, Some Moments with the Triple-Beam Balance, Leon Ukens and John Wessner; **28**, 538 (1990)
van den Berg, Daday, A Launcher for Projectile Motion, Daday van den Berg and Ed van den Berg; **28**, 477 (1990)
van den Berg, Ed, A Launcher for Projectile Motion, Daday van den Berg and Ed van den Berg; **28**, 477 (1990)
Van Wyk, Steve, *Not by Design—The Origin of the Universe*, V.J. Stenger, Prometheus Books, 1988 (BR); **28**, 60 (1990)
Superconductivity; **28**, 621 (1990)
Voss, Howard G., Distinguished Service Citation: *Howard G. Voss*; **28**, 141 (1990)
Wack, Paul E., Binary Aging (L); **28**, 363 (1990)
Wagner, William S., Measuring the Heat Produced by a Single Candle; **28**, 420 (1990)
Wake, Masayoshi, Floating Magnet Demonstration; **28**, 395 (1990)
Wakeland, Ray Scott, Wave Speed on a String Revisited, Ray Scott Wakeland and Bennet Brabson; **28**, 57 (1990)
Wallingford, J., Avoiding the Glare (L); **28**, 362 (1990)
Walstad, Allan, The Hammer Flip; **28**, 556 (1990)
Walton, Dick, Index of Refraction of He and SF_6; **28**, 323 (1990)
Self-Inflating Balloons; **28**, 324 (1990)
Warren, William R., Visual Relativity; **28**, 55 (1990)
Watson, James, Slides: Terrestrial Neighbors, James Watson and Nancy Watson; **28**, 54 (1990)
Watson, Nancy, Slides: Terrestrial Neighbors, James Watson and Nancy Watson; **28**, 54 (1990)
Weltenbeck, Anthony J., An Astronomical Illustration of the Zeeman Effect; **28**, 511 (1990)
Weltner, Klaus, Aerodynamic Lifting Force; **28**, 78 (1990)
Bernoulli's Law and Aerodynamic Lifting Force; **28**, 84 (1990)
Author's Response (L); **28**, 518 (1990)
Wessner, John, Some Moments with the Triple-Beam Balance, Leon Ukens and John Wessner; **28**, 538 (1990)
West, Kenneth D., A Science Friction Adventure, Craig W. Smith and Kenneth D. West; **28**, 301 (1990)
Willis, Courtney W., The Lemon Screamer, the Lasagna Cell, and the Physics Teacher, Courtney W. Willis and Lois Nicholson; **28**, 329 (1990)
Winiger, Walter, A Long Precision Air Track, Fritz Schoch and Walter Winiger; **28**, 618 (1990)
Winter, Rolf G., On the Difference between Fluids and Dried Beans; **28**, 104 (1990)
Winters, Loren M., High-Speed Flash Photography with Sound Triggers; **28**, 12 (1990)
Young, Matt, A Mole Is a Mole (L); **28**, 361 (1990)
Zaleskiewicz, T.P., TV Experiment: "G"; **28**, 114 (1990)
TV Experiment: Velocity of Light; **28**, 116 (1990)

Advertisement



The Beck Ball Pendulum
Model M-965
Price...$429.50...FOB

This pendulum has been continually refined through more than twenty years of production and use.

All original design features are still here. These include the three velocity gun, a ball bearing pendulum assembly mount, and a simple ball trapping mechanism with the ubiquitous rubber band.

Through the years, we have improved tolerances and clearances, gone to extensive use of stainless steel rather than plated parts, and now use an injection molded rack made of structural nylon. This rack will fit older pendulums in service and is available for these units without charge or paperwork.

This continues to be the finest pendulum that we can build.

BERNARD O. BECK & CO.
P.O. Box 272 • Arlington, Texas 76010

Zanetti, Vittorio, Sunglasses that Switch On and Off, John Harris and Vittorio Zanetti; **28**, 200 (1990)
Zhao, Jiu-ming, A Simulation of the Hydrogen Spectrum; **28**, 596 (1990)
Zhong, An, Determine the Magnetic Induction of a Coil with a Hall Element; **28**, 123 (1990)
Zhu, E-Qing, A Quick Method to Measure the Density of Air, Se-yuen Mak and Zhu E-Qing; **28**, 406 (1990)
Zollman, Dean, Learning Cycles for a Large-Enrollment Class; **28**, 20 (1990)

This index was carefully composed by hand. Although it was scrupulously checked for accuracy, an error or two may have crept in. If so, we apologize and ask that you let us know of any mistakes we may have made. This will ensure that your entries in the ten-year index are correct. Call or write the Production Office (AAPT, The Physics Teacher, 5112 Berwyn Road, College Park, MD 20740, Attn: Linda Sigmon, 301/345/4200).